Form SF298 Citation Data

Report Date ("DD MON YYYY")	Report Type	Dates Covered (from... to) ("DD MON YYYY")
00062000	N/A	

Title and Subtitle Air Mobility: The Key to the United States National Security Strategy	**Contract or Grant Number**
	Program Element Number
Authors Hazdra, Richard J.	**Project Number**
	Task Number
	Work Unit Number
Performing Organization Name(s) and Address(es) School of Advanced Air Power Studies Air University Maxwell AFB, FL 36112	**Performing Organization Number(s)**
Sponsoring/Monitoring Agency Name(s) and Address(es)	**Monitoring Agency Acronym**
	Monitoring Agency Report Number(s)
Distribution/Availability Statement Approved for public release, distribution unlimited	
Supplementary Notes	
Abstract	
Subject Terms	
Document Classification unclassified	**Classification of SF298** unclassified
Classification of Abstract unclassified	**Limitation of Abstract** unlimited
Number of Pages 110	

DISTRIBUTION A:

Approved for public release;distribution is unlimited.

School of Advanced Airpower Studies
Maxwell AFB, Al 36112

AIR MOBILITY:

THE KEY TO THE UNITED STATES

NATIONAL SECURITY STRATEGY

BY

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A THESIS PRESENTED TO THE FACULTY OF
THE SCHOOL OF ADVANCED AIRPOWER STUDIES
FOR THE COMPLETION OF GRADUATION REQUIREMENTS

SCHOOL OF ADVANCED AIRPOWER STUDIES
AIR UNIVERSITY
MAXWELL AIR FORCE BASE ALABAMA
JUNE 2000

Disclaimer

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Major Richard J. Hazdra received his commission through the Air Force Officer Training School at Lackland AFB, Texas, in 1986. He graduated from Undergraduate Navigator Training School at Mather AFB, California, in 1987. From 1987 until 1990, he performed KC-135A navigator duties while assigned to the 410th Bombardment Wing at K.I. Sawyer AFB, Michigan. During his assignment at K.I. Sawyer he was the youngest navigator to fly in Strategic Air Command's Bombing and Navigation Competition in 1987. From 1990 until 1996, while assigned to the 19th Air Refueling Wing at Robins AFB, Georgia, he performed the following duties: Instructor Navigator, Standardization and Evaluation Navigator, Chief of Ground and Tanker Scheduling, Executive Officer, and Chief of strategic Combat Plans. He is a Gulf War veteran with over 300 combat and combat support flight hours during Operation Desert Storm. From 1996 until 1998, while assigned to the 12th Flying Training Wing at Randolph AFB, Texas, he performed the duties of Instructor Navigator, Chief of Joint Undergraduate Navigator Training Student Control, and Executive Officer. He then graduated from Air Command and Staff College at Maxwell AFB, Alabama, in 1999 and from the School of Advanced Airpower Studies also at Maxwell AFB, in 2000. Major Hazdra has a Bachelor of Arts degree in Political Science from Benedictine University in Lisle, Illinois, and a Master of Science degree in Aeronautical Science from Embry Riddle Aeronautical University in Daytona Florida. He is a senior navigator with over 2,600 flying hours. Currently assigned to United States Transportation Command headquarters at Scott AFB, Illinois, in the Operations and Logistics Directorate, he performs duties as a joint training and readiness officer. He is married to the former Susan L. Thalmann of Oakbrook Terrace Illinois, and they have one daughter, Jacqueline, who is 13.

Acknowledgements

A number of people helped in accomplishing this project. I thank my wife Sue and daughter Jacqueline, whose time and patience allowed me to be a parent in abstentia while working on this project. I also thank Jim Corum, PhD, for his outstanding advice and guidance on putting this project together and getting it on paper. His enthusiasm about my ideas for the project fueled my continued interest. I also thank Lt Col Forrest Morgan, PhD, whose advice and guidance helped me present a clear picture of the Air Mobility Command force structure issues. I also want to thank the assistant dean of the School of Advanced Airpower Studies, Mr. Dennis Drew, for teaching me to write more effectively. After reading my first piece, he told me that I write like I am talking on the radio and then taught me how to get my ideas across on paper. After talking over the radio as a navigator for 12 years, I became use to very short, ever curt, sentences. Finally, I also thank Col Mike Fricano and Col Rob Owen from Air Mobility Command, and Col John Brower, the Air Mobility Command chair at Air University, for their inputs in clarifying much of the data required on this project.

Abstract

Since airlift was first used as a tool of national security during the Berlin Airlift, it has grown to deliver passengers, cargo, and fuel to operations worldwide in support of national security. However, Air Mobility Command is the single organization that performs for air mobility for the United States. Currently, the Air Force has structured Air Mobility Command for war, yet this command performs operations during times when the US is at peace. Air Mobility Command performs missions to support US military operations in hostile environments as well as humanitarian operations in non-hostile environments. The number of operations requiring mobility air forces has been on the rise since the Cold War ended 10 years ago. These steady-state operations seem to over task mobility air forces. This study centers on the question: Can Air Mobility Command's force structure, organized for two major-theater wars, fulfill that requirement and perform the steady-state operations in today's strategic environment? This study finds that Air Mobility Command's force structure cannot meet its requirements for two major-theater wars and that the current force structure is inefficient in meeting the requirements for steady-state operations. First, this thesis presents a primer to acclimate the reader to the complex environment and multifaceted requirements of mobility air forces. Next, this thesis examines Air Mobility Command's current force structure as determined by Department of Defense requirements for war. Then this thesis also describes the various types of missions that Air Mobility Command performs on a steady-state basis and evaluates the importance of these operations in fulfilling US National Security Strategy. Finally, this thesis recommends action that the Air Force and the Department of Defense should investigate in order to improve their air mobility capabilities in support of the National Security Strategy

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CHAPTER 1

INTRODUCTION

If we do not build a transportation system that can meet the needs of tomorrow, then it doesn't matter much what kind of force we have because it won't be able to get there.

General John M. Shalikashvili

Air mobility is the key to unlocking the strength of US airpower because it performs rapid global mobility. US military forces have relied on this capability since Word War II, and it has always been there. Combatant Commanders increasingly rely on air mobility to transport forces quickly into their theaters to head off potential crises, and Air Mobility Command always responds enthusiastically with the necessary assets. When the national command authorities task the Department of Defense to achieve any objective, it relies on Air Mobility Command to achieve rapid global mobility requirements. Consequently, mobility air forces have a remarkable reputation for getting the job done for the Department of Defense and combatant commanders. Since, Air Mobility Command has always achieved its objectives, neither the Air Force nor the Department of Defense has conducted a thorough examination to determine if air mobility capabilities will suffice in the future. However, the time has come to review the force structure of Air Mobility Command to see if it can realistically continue to meet national security requirements.

Key to National Security

Air mobility is the key that unlocks the national security strategy, and consequently, Air Mobility Command's force structure is crucial for the US to implement its national security strategy. This study examines the force structure of Air Mobility Command, which is based a two major-theater wars model. However, the National Security Strategy requires US military forces to perform duties over a range of operations worldwide, and, in fact, the Department of Defense has increasingly deployed military forces toward those ends. This study asks the question: Can a force structure based on the possibility of fighting two major-theater wars satisfy the requirements for steady-state operations? Air Mobility Command's force structure is the key to the national security strategy because it ultimately determines how far and how fast the Air

Force can achieve its vision of *Global Engagement*. Air mobility provides the quickest mode of transportation to move military forces into an area where United States interests are at stake, whether for peaceful engagement or for combat operations.

For over fifty years, the United States has employed air mobility assets to advance US interests and policies, often without employing combat operations. The Berlin Airlift, where aircraft supplied an entire city from June 1948 to August 1949, is probably the most famous example of airpower used in a peaceful context. In contrast, airlift over the Himalayas to supply Army Air Force operations in China during World War II, demonstrates the use of air mobility to supply combat operations.

Air mobility is a flexible, non-destructive form of airpower. Yet, mobility air forces are also designed to support joint operations in two major-theater wars. Since the end of the Cold War, the US National Security Strategy that has emphasized "presence" and "engagement" has placed unprecedented demands on air mobility forces. The question therefore arises: should Air Mobility Command continue to design its force structure on two major-theater wars model?

Three Issues

I will examine three corollary issues. The first issue concerns air mobility as a form of airpower that enables the military instrument of power in two basic ways. First, mobility air forces can rapidly transport combat air units to any point on the planet in order to execute operations directed by national command authorities. Secondly, mobility air forces support peace operations that reinforce national-political objectives. These peacetime operations display United States commitment to its interests and allies while building goodwill among non-allied nations.[1] In evaluating the effectiveness of these peacetime operations, it is important to ask the question: do they deter potential adversaries?

The second issue addresses the requirements placed on mobility air forces. During the 1990s, the national command authorities employed mobility air forces as a political-military tool. However, while downsizing, the Department of Defense did not anticipate the increased requirement for mobility air forces as a political-military tool. A review of the employment of mobility air forces in the 1990s will look at the missions they performed.

[1] Hutcheson and McClure, 139.

The third issue is the structure of mobility air forces and the effectiveness of that structure. Air Mobility Command is emerging as a primary military instrument of power within the Air Force. Thus, three questions arise. First, is the force structure of Air Mobility Command adequate to meet the demands of a two major-theater war? Second, can mobility air forces meet the increased demands placed on them by the national command authorities? Third, has the Air Force correctly prioritized air mobility in its overall force modernization plan?

Literature Review

Some strategic documents, studies, and articles have already addressed these issues, although the studies have been limited in scope. The Quadrennial Defense Review and the National Defense Panel are just two of those studies. The authors of these documents and studies wrote for specific purposes other than examining the structure of mobility air forces, and consequently, they do not address the issues pertinent to the structure of mobility air forces.[2] It is important to take a more comprehensive look to understand the strengths and weaknesses of air mobility. Understanding mobility air forces provides a foundation from which the Air Force can employ these forces to achieve the objectives set forth in the national security documents listed below.

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[2] Department of Defense, Joint Chiefs of Staff, Logistics Directorate, *Mobility Requirements Study Bottom-Up Review Update*, Washington D.C.:JCS, 28 March 1995. Department of Defense, *Report of the Defense Science Board Task Force on Strategic Mobility*, Washington D.C.: Office of the Under Secretary of Defense for Acquisition and Technology, August 1996. US Congress, *Strategic Airlift: Improvements in C-5 Mission Capability Can Help Meet Airlift Requirements,* GAO/NSIAD-96-43, Washington D.C.: US General Accounting Office, November 1995. US Congress, *Military Airlift: Options Exist for Meeting Requirements While Acquiring Fewer C-17s*, GAO/NSAID-97-38, Washington D.C.: US General Accounting Office, February 1997. US Congress, *Moving US Forces: Options for Strategic Mobility*, US Congressional Budget Office, February 1997. Alan Vick, David T. Orletsky, Abram N. Shulsky, and John Stillion, *Preparing the U.S. Air Force for Military Operations Other than War*, Santa Monica, California: RAND, 1997. Juliane K. Smith, Lieutenant Colonel Steve Cheavens, and Major Michael Zenk, *1991 Tanker Study*, Offutt AFB, Nebraska: Strategic Air Command, 1 March 1991. James P. Stucker, *Analyzing the Effects of Airfield Resources on Air lift Capacity,* Santa Monica, California: RAND, 1999. James P. Stucker, and Ruth Berg, *Understanding Airfield Capacity for Airlift Operations*, Santa Monica, Calif.: RAND, MR-700-AF/OSD, 1998. Thomas McCaffrey, *Ready Reserve Force Contingency Crewing Requirements Study*, Alexandria, Virginia: McCaffery & Whitener, December 15, 1995. John Lund, Ruth Berg, Corinne Reploge, *An Assessment of Strategic Airlift Operational Efficiency,* Santa Monica, Calif.: RAND, 1993. David Kassing, *Army and Marine Corps Prepositioning Programs: Size and Responsiveness Issues*, PM-378-CRMAF, Santa Monica, Calif.: RAND, April 1995. David Kassing, "Strategic Mobility in the Post-Cold War Era," in Paul K. Davis, ed., *New Challenges for Defense Planning,* MR-400-RC, Santa Monica, Calif.: RAND, 1994. Jean R. Gebman, Lois J. Batchelder, and Katherine M. Peohlmann, *Finding the Right Mix of Military and Civil Airlift, Issues and Implications Volume 2*, MR-406/2-AF, Santa Monica, Calif: RAND, 1994. Christopher Bowie, *The New Calculus: Analyzing Airpower's Changing Role in Joint Theater Campaigns,* MR-149-AF, Santa Monica, California: RAND, 1993.

The Mobility Requirements Study evaluated the requirements to support two major-theater wars beginning within 30 days of each other.[3] In that context, air mobility forces would support friendly forces in halting the adversary in the first theater while building up equipment and supplies for the counter offensive within 30 days. Once the adversary stopped his offensive, a reduced number of air forces mobility assets would sustain operations, while the preponderance of mobility air forces would transfer to a second theater to support friendly forces in halting another adversary. This scenario raises numerous questions about the current state of mobility air forces. Can Air Mobility Command provide enough support to friendly forces for them to halt an enemy in the first theater of operations? Does Air Mobility Command possess enough assets to both sustain one theater of operations while building up friendly forces in a second theater of operations? Can Air Mobility Command's force structure meet the requirements to buildup and support friendly forces if two major-theater wars break out in less than 30 days?

Air Mobility Command's long-range plan address the requirements imposed on mobility air forces that the Mobility Requirements Study Bottom-Up Review determined.[4] In addition, Air Mobility Command's long range plans deal with the requirements to upgrade the current fleet of strategic aircraft to comply with the new aviation regulations in both the US and Europe. I will analyze these long-range plans to examine the feasibility of Air Mobility Command meeting the requirements for two major theater wars.

Several congressional studies address the requirements to acquire the C-17 and upgrade existing airframes such as the C-5 and C-130. All of these studies base their recommendations for air mobility requirements on the two major theater war model rather than the current operations tempo of these airframes. Thus, the question arises: can a force structure oriented toward the possibility of two major theater wars meet the requirements of today's current steady-state operations?

The Quadrennial Defense Review (QDR) examined the US defense strategy and dealt with the strategic environment for US military operations. The worst-case threat scenario in the QDR is two major theater wars. The QDR acknowledges the role that air mobility will play

[3] Department of Defense, Joint Chiefs of Staff, Logistics Directorate, *Mobility Requirements Study Bottom-Up Review Update*, Washington D.C.:JCS, 28 March 1995, which is commonly referred to as MRS BURU.
[4] *1998 Air Mobility Master Plan: Rapid Global Mobility*, Scott AFB, Illinois: Air Mobility Command Directorate of Plans and Programs, October 1997. *Air Mobility Strategic 2000,* Scott AFB, Illinois: Air Mobility Command Directorate of Plans and Programs, November 1999.

when units respond to crises more quickly and have less time to prepare.[5] The QDR cites the C-17 program as a solution for these challenges in meeting the requirements for airlift.[6] The QDR, however, stops short of specifically addressing what force structure Air Mobility Command will require to perform rapid global mobility. The QDR only says: "Across the services, changes in force structure and personnel end strength will be made to reflect improvements in operational concepts and organizational arrangements and to protect the full spectrum of combat capability to the maximum extent possible." Should the Department of Defense examine the force structure of Air Mobility Command to meet the requirements set forth in the QDR?

The National Defense Panel examined the requirements to transform the US military force structure into one that could meet the needs of future national security. This panel considered the two major theater war model to be a force-sizing function rather than a strategy. According to the National Defense Panel, the force structure must have the ability to respond to new challenges from information attacks, weapons of mass destruction, space operations, the absence of forward bases, deep inland operations, and mass refugee and disease problems. Of these, the latter two challenges raise questions about the current force structure of mobility air forces. Can today's Air Mobility Command force structure provide the support needed to conduct deep inland operations with reduced access to forward bases? Can today's airlift assets provide necessary relief supplies to mass refugees or epidemic inflicted populations? This study examines Air Mobility Command's current force structure and looks at its capability to perform these operations.

Methodology

Several questions are necessary. Where does Air Mobility Command fit into the defense transportation structure? What is the basis of Air Mobility Command's force structure? What requirements are placed on mobility air forces? How are these requirements calculated? Can mobility air achieve these requirements? How has Transportation Command employed mobility air forces to accommodate the growth of steady-state operations during the last decade of the twentieth century? Are there any technologies that could facilitate Air Mobility Command's growth of steady-state operations? Can mobility air forces become more efficient?

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[5] Secretary of Defense, William S. Cohen, *Report of the Quadrennial Defense Review*, Washington, D.C.: US Government Printing Office, May, 1997, Section 6, 3.
[6] *Ibid,* Section 7, 2.

To answer these questions, this study first looks at US Transportation Command's organization. It also looks at the history of the operational employment of mobility air forces since 1990 to include Operation Desert Storm, the largest major theater war of the 1990s. This study should examine ways in which the Department of Defense and the Air Force can make mobility air more efficient.

This study will examine the current Air Mobility Command force structure. Aspects of the force structure that this study examines include the US Transportation Command, Air Mobility Command, the two-major-theater-war model, military operations that have taken place around the world during the 1990s, and the National Security Strategy.

This study first defines and explains the complex networks that make up the defense transportation system. Then it examines when and why Air Mobility Command employs specific air transport systems and distinguishes between commercial versus military air transportation. The next step will be to analyze how best to employ both commercial and military air transportation and look at their respective strengths and weaknesses. Major regional contingencies and the steady-state operations imposed by the current presidential administration present a dynamic set of circumstances. This study examines reports from past Air Mobility Command commanders, air mobility experts, reports submitted to Congress, and historical data pertaining to the use of airlift assets. In introducing this evidence, this study analyzes whether Air Mobility Command's force structure, currently based on a two major-theater wars model, is suited for either that model or for steady-state operations.

Organization of the Thesis

This work organizes the research into three sections and further divides into seven chapters. The first section provides the background from which to understand the air mobility system. Chapter one is this introduction. Chapter two examines the complexities of the defense transportation system and the role that Air Mobility Command fulfills in United States Transportation Command. It explains where and how Air Mobility Command fits into this complex system.

The second part of this study are chapters two and three, which examines the requirements that Transportation Command imparts to Air Mobility Command and the force structure that Air Mobility Command employs to meet those requirements. Chapter three analyzes the force structure requirements of Air Mobility Command based on the two-major-theater-war model and explains the metric used to determine those requirements. This chapter also examines time-phased force deployment data requirements and explains their incongruities. Chapter four examines the current force structure that includes both the aircraft and personnel that perform the air mobility mission. This chapter looks at how well that force structure can meet the requirements defined in chapter two.

The third part of this study examines the technological innovations needed to achieve the requirements placed on Air Mobility Command. Chapter five examines the requirements for a force structure based on Air Mobility Command's current steady-state operations that mobility air forces perform daily around the world. This chapter analyzes the mobility air forces role in the different types of operations implemented during the 1990s. Chapter six also critically examines the implied requirement for air mobility forces and the implications arising from military intervention that emanate from the National Security Strategy. This chapter also looks at some technological innovations that could better facilitate the employment of air mobility forces for these military interventions.

Importance of this thesis

The Air Force and the Department of Defense exploits air mobility as a form of airpower because of the positive political gains from non-combat operations, deterrence, and combat when necessary. The structure of mobility air forces determines their efficiency when performing their missions. In answering the questions set forth, this study will shed light on the issues surrounding Air Mobility Command's force structure.

CHAPTER 2

The Mobility SYSTEM

Supply and Transport stand together or fall apart; history depends on both.
Prime Minister Winston Churchill

Air mobility is both a complex system and a part of an interrelated transportation system. Many people perceive ambiguity when discussing air mobility issues or they fail to comprehend aspects of the defense transportation system. This chapter is a primer for those who have questions about what air mobility is and how it fits into the Department of Defense.

To understand Air Mobility Command's force structure it is important to outline how it fits into Transportation Command, a command that integrates a vast array of commercial and military organizations employing different modes of transportation into a mobility force. To understand the Defense Transportation System, one must first identify the responsibilities of US Transportation Command and its component commands. Numerous missions and airlift programs of Air Mobility Command combine to form a complex air-mobility system.

United States Transportation Command

United States Transportation Command evolved quickly under the auspices of the Goldwater-Nichols Act, as the Defense Department's single manager for Department of Defense transportation requirements.[7] Originally consigned to manage only wartime transportation requirements, a Secretary of Defense memorandum in February 1992 designated United States Transportation Command as the single management organization for defense transportation in both peace and war following the Gulf War. Department of Defense Directive 5158.4 formalized this decision on 8 January 1993 and transferred command authority of Air Mobility Command, Military Sealift Command, and Military Traffic Management Command along with all military transportation assets, to Transportation Command.

United States Transportation Command executes its mission through three component commands as well as the component command's respective reserve, National Guard, and commercial counterparts. Military Sealift Command, the navy component, provides sealift

[7] *Goldwater-Nichols Department of Defense Reorganization Act of 1986,* 99th Cong., 2nd sess., H.R. 2181.

services and executes the Voluntary Intermodal Sealift Agreement contracts for chartered ships. Military Traffic Management Command, the Army component of Transportation Command, provides traffic management services and traffic engineering, administers the Contingency Response program, and serves as the single port manager. Air Mobility Command, the airlift component of Transportation Command, provides airlift, aerial refueling, and medical-evacuation transportation services and aerial-port management services. Air Mobility Command is also the single point of contact with the commercial airline industry for procurement of defense airlift services and mobilizing the Civil Air Reserve Fleet.

Approximately one-third of United States Transportation Command's capability relies on reserve and National Guard forces. Reserve forces comprise: 46 percent of Air Mobility Command's airlift capability, 88 percent of Military Sealift Command's capability, and 56 percent of Military Traffic Management Command's capability.[8] The Reserve forces and National Guard work with their active duty colleagues on a daily basis to execute Transportation Command's peacetime mission.

Transport of Military Forces

During peacetime, the services and Defense Logistics Agency determine which forces require movement and collect information on force requirements for troops, materials, and equipment. Subsequently, the services and Defense Logistics Agency submit transportation requests for military forces movement to the United States Transportation Command, who then plans the movement. Transportation Command, through its traffic management function, allocates transportation resources for those movements and executes them.

In preparation for potential crisis or war and when directed by the joint chiefs of staff or the national command authorities, theater commander's operations plans within their own area of responsibility. In doing so, they identify their specific requirements and recommend the time-phased force and deployment or TPFDD of forces to arrive in the theater for specific operations.[9] The theater commander's TPFDD identifies the units that will support the operation, along with the priority and sequence of arrival in theater of those units to include their route, type of transportation, and port of debarkation. Transportation Command determines the feasibility of

[8] USTRANSCOM HANDBOOK 24-2,*Understanding the Defense Transportation System*, 1 October 1998, 3.

the theater commander's TPFDD based on an assessment of strategic and theater lift assets available, the requested transportation infrastructures, and the apportioned transportation resources. Next, Transportation Command works in conjunction with the theater commander to adjust the TPFDD in order to make it feasible. When a theater commander subsequently certifies the TPFDD, Transportation Command loads the appropriate TPFDD into the Joint Operation Planning and Execution System.[10] This system, commonly called JOPES, provides subordinate commanders and planners with mobilization information and the time-phased deployment schedule of the military forces tasked to support the executed military operation. JOPES also provides them with the transportation information required to sustain the military operation. This process can occur over several months.

Strategic Mobility Triad

Transportation Command combines the attributes of sealift, prepositioning, and airlift, into a synergistic force multiplier, to meet the transportation requirements set forth in JOPES for any planned operation. The Defense Transportation System provides transportation for military forces along with the necessary support material and equipment needed both to initiate an operation and to sustain it. Military operations require the deployment of troops and equipment within days because of global interests and the tendency for political and military situations around the world to change rapidly. Theater commanders rely on Transportation Command to fill the transportation requirements of a reaction force. In achieving those requirements, the mobility triad strategy meets three basic criteria: 1.) It rapidly deploys military forces; 2.) It sustains them until the combatant commander achieves the military objectives; 3.) It redeploys these forces either back to the United States or to another theater of operations.[11] The strategic mobility triad combines the attributes of sealift, prepositioning and airlift, into a synergistic force multiplier, to meet the transportation requirements of military operations.

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[9] Joint Publication 3-35, *Joint Deployment and Redeployment Operations*, 7 September 1999, I-6.
[10] Joint Publication 5-03.1, *Joint Operational Planning and Execution System*, Volume I, Planning Policies and Procedures, 4 August 1993, N-5 to N-10.
[11] Joint Publication 3-35, I-8

Sealift

Simply by virtue of the size of heavy cargo ships, sealift provides the best means to move the largest quantity of equipment, materials, and supplies at the lowest cost. Sealift is especially useful in meeting the demand to transport outsized cargo such as tanks and other large pieces of equipment necessary to sustain forces. Air Mobility Command categorizes an item as outsized if it is too large to fit on either a typical commercial air transport or a C-141, it core airlifter. However, the capabilities to transport large amounts of oversized and outsized equipment by sealift has a drawback in taking more time to transport. Ships operate in terms of days and weeks, and aircraft in terms of hours. Yet, without the capability of sealift assets to transport in great quantities, the United States military would be severely limited.

Prepositioning

Prepositioning provides deployed forces with the equipment and supplies they need to conduct operations without Transportation Command having to move those supplies. Prepositioning reduces the time needed to place the necessary military forces into the theater of operations. Prepositioning may consist of cargo ships afloat near the theater of operations.[12] These ships contain equipment and materials for forces required for the operation as set forth in JOPES. Prepositioning may also consist of shore-based storage facilities. Both prepositioning strategies reduce the response time of US armed forces. Prepositioning is critical to the success of Transportation Command during war because it reduces the transportation requirements for operations. In addition, without prepositioning, airlift assets would be unable to achieve rapid global mobility for all the forces required in an operation.

Airlift

Time-sensitive lift requirements, where short notice transportation requirements due to changing tactical situations or other developments that require a rapid response, depend on airlift capabilities.[13] The determination of unplanned movement requirements depends on whether or not the president has directed the execution of the operation plan. Before the execution of an operations plan, combatant commanders can request to use special assignment airlift missions.

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[12] *Ibid*, I-9

[13] Joint Publication 4-01, *Joint Doctrine for the Defense Transportation System*, 17 June 1997, IV-5

However, due to the limited availability of airlift assets, Transportation Command controls these special assignment airlift missions to ensure airlift availability for the execution of the operations plan. Once the president directs an operations plan, unexpected transportation requirements invariably occur. However, since allocated airlift assets are already committed, Transportation Command, in coordination with the combatant commander, will attempt to perform the airlift requirement in one of three ways: use airlift assets from NATO or allied nations; defer movement of lower priority requirements to sealift; request airlift reallocation from the chairman of the joint chiefs of staff through the Joint Transportation Board.[14] Airlift, because of its rapid global mobility burden, is often the most restrictive factor in conducting operations.

Air Mobility Command

The Air Force on 1 June 1992 activated Air Mobility Command to replace Military Airlift Command.[15] General Hansford T. Johnson, formerly commander in chief, Military Airlift Command, became the commander of Air Mobility Command and retained his position as commander in chief of United States Transportation Command.

The Air Force designated Air Mobility Command as the lead command for air mobility issues in October 1996.[16] In this capacity, Air Mobility Command develops weapon system standards and integrates command and control processes for forces. To comply with these responsibilities, Air Mobility Command standardizes global air mobility processes and functions. Furthermore, Air Mobility Command is present around the world with fixed operating sites, deployable support teams, liaison teams, and air mobility forces continuously operating. As noted, Air Mobility Command controls several air mobility components to execute its mobility missions that, in turn, encompass a multitude of airlift programs.

To handle this complex system of programs and assets, the Tanker Airlift Control Center or TACC, tasks units to schedule, task, manage, coordinate, control, and execute Air Mobility Command missions and requirements. The TACC provides centralized control of Air Mobility assets as the single point of contact for the worldwide air mobility missions. This system includes fixed and deployable enroute mission support forces. Through the Global

[14] *Ibid*, IV-5.
[15] History, Air Mobility Command, *Air Mobility Command 1992 Historical Highlights,* Scott AFB, Ill: Air Mobility Command History Office, 1993, 1-5.

Transportation Network (GTN), the TACC is able to track the status and location of personnel and cargo, which Transportation Command and Air Mobility Command commonly refer to as in-transit visibility, commonly called ITV.

Air Mobility Components

The air mobility system is comprised of four main components: the active-duty forces, the Air Force Reserve forces, the Air National Guard forces, and the Civil Reserve Air Fleet or CRAF commercial air carriers. Together these elements meet airlift requirements by providing the crews, aircraft, and support forces for strategic air-mobility operations, in-theater air-mobility operations, and operational support airlift. Unfortunately, the air mobility system has a limited surge capability to meet any Joint Task Force requirement during a crisis.

Active Duty

Military personnel on active duty comprise the core of the staff personnel at Air Mobility Command headquarters where they perform the staff duties to execute the airlift programs and orders. Active duty forces also conduct the core day-to-day airlift missions and most of those missions requiring special training and equipment. They provide accessible and flexible airlift, immediately available, for worldwide duty. While active duty airlift forces offer a great advantage in terms of availability on a full-time basis, airlift demand consistently outpaces availability. Air Mobility Command, consequently, relies on both the Air National Guard and the Air Force Reserve to help meet the daily demands of the airlift system.

Air Force Reserve and Air National Guard

During peacetime, the Air Force Reserve and Air National Guard provide significant volunteer forces and assets to augment active duty manpower and equipment. Air Force Reserve and Air National Guard forces maintain the same mission-ready status as their active duty counterparts. They both provide strategic air mobility forces to the Transportation Command and in-theater, air-mobility forces to theater commanders. These forces also perform unique missions such as aerial fire fighting, hurricane hunting, aerial spray operations, and psychological operations. Air National Guard forces are also available to their state governors.

[16] *Ibid.*

These volunteer forces maintain a delicate balance between their peacetime mission requirements and the needs of their civilian employers. When mobilized by the president, however, Air Force Reserve and Air National Guard units are placed on active duty status and may be used in the same manner as active duty units.

Civil Reserve Air Fleet

The CRAF provides increased airlift capacity to Transportation Command during contingency and wartime operations. It provides commercial aircraft and aircrew to augment active duty, Air National Guard, and Air Force Reserve forces. In the CRAF program, commercial air carriers voluntarily commit aircraft to augment airlift requirements that exceed the capabilities of Air Mobility Command's military fleet. Commercial air carriers pledge their aircraft through one or more of three stages: stage I entitled Committed Expansion; stage II, entitled Defense Airlift Emergency; and stage III, entitled National Emergency. The CRAF program provides a sizable portion of strategic airlift capability without the government having to purchase additional aircraft, pay personnel costs, or fly and maintain the aircraft. Airlines however, get generous subsidies to conduct these sorties. As the demand for airlift increases in a conflict, the commander of Transportation Command, upon approval of the secretary of defense, may incrementally activate the CRAF in stages based on the urgency of airlift requirements. According to a recent RAND study, replacing the CRAF capability with military aircraft would have cost the Department of Defense about $1 billion to $3 billion annually over the past 30 years.[17] The Department of Defense rewards commercial air carriers for CRAF participation with Defense Transportation business during peacetime through a variety of subsidy programs.[18]

Air Mobility Missions

The above air mobility components integrate to perform the triad of missions that Air Mobility Command is responsible for providing to the Department of Defense: air mobility

[17] Jean R. Gebman, Lois J. Batchelder, and Katherine M. Peohlmann, *Finding the Right Mix of Military and Civil Airlift, Issues and Implications Volume 2,* MR-406/2-AF, Santa Monica, Calif: RAND, 1994.40-43.

[18] CRAF carriers receive preference when applying for non-defense business from the US governement and they can conduct commercial business at military bases. Peter Grier, "The Comeback of CRAF," *Air Force Magazine,* Vol. 78, no. 7, Arlington, Virginia: Air Force Association, July 1995, 53. CRAF subsidies from the US government are estimated to exceed $2 billion dollars a year based on information compiled from the USTRANSCOM Handbook 24-2.

support, aerial refueling, and airlift. This air mobility triad integrates into an air mobility force. Air mobility support provides the foundation of the triad because airlift and air refueling can operate independently, but neither can operate without air mobility support. The aerial refueling mission encompasses eleven separate tasks, and the airlift mission encompasses five separate tasks. All sixteen of these tasks are critically important to the Department of Defense.

Air Mobility Support

All Air Mobility Command bases, both domestic and overseas, provide services for command and control, aerial port operations, aircraft maintenance, operating airport facilities, weather, fire protection, life support, and intelligence to air mobility assets. At overseas locations, if the host nation is unable to provide any of these services, then Air Mobility Command augments those units as needed.

Each air mobility support squadron operates an air mobility control center, which serves as the command and control conduit to the TACC in order for them to track air mobility sorties. The GTN links the various command and control systems to provide theater and subordinate commanders with the transportation status of personnel and cargo.

Two air mobility support groups and their subordinate air mobility support squadrons, twelve in all, provide enroute support at twelve different overseas locations. These units provide worldwide support to air mobility operations at fixed enroute locations along established channels structures. Whereas an air mobility wing retains operational control of most air mobility support units with in the US, the TACC holds operational control over the Air mobility support groups along with their subordinate squadrons.[19] Administrative control for these units conversely falls to their respective numbered air forces (See Figure 2.1).

[19] Air Force Doctrine Document 2-6.1, *Airlift Operations*, 13 November 1999, 62.

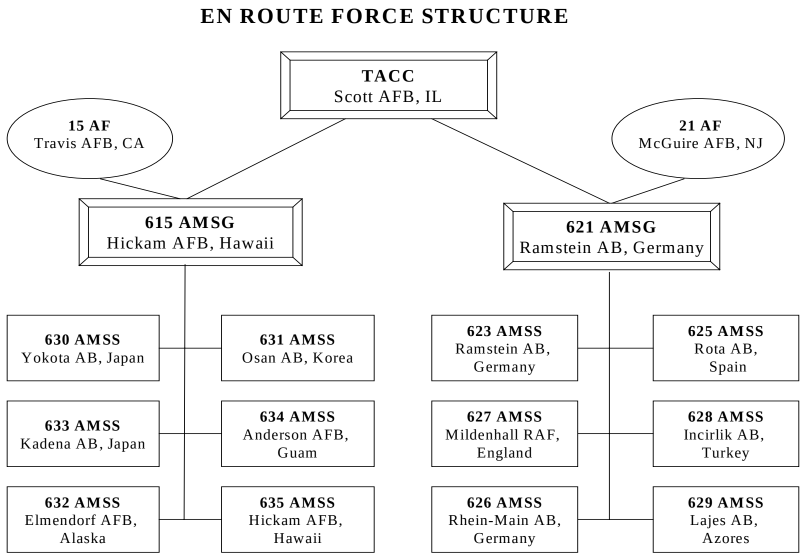

Figure 2.1

At overseas locations, air mobility support units, depending on requirements, provide maintenance and airhead operations. Maintenance regenerates aircraft versus, providing sustained maintenance and also aircraft marshaling, parking, refueling, and limited aircraft troubleshooting and repair capability. If specific aircraft repair capability is required, an additional maintenance recovery team will deploy with specialists, equipment, and parts to accomplish the repair. Airheads onload and offload a set number of aircraft based on forecast requirements. Aerial port specialists establish a marshaling yard and traffic routing for cargo, aircraft servicing, passenger manifesting, and air terminal operations. They also coordinate inter-theater and intra-theater air mobility operations by coordinating numerous activities: airbridge operations, channel-route operations, international airfield surveys, and host-nation support. Air mobility support units tailor services to meet the requirements of specific operations.

Aerial Refueling

Tankers perform strategic missions between the continental United States and theaters of operation as well as operational and tactical missions within a theater of operation. Tankers perform seven strategic missions: Single Integrated Operation Plan execution, global attack support, airbridge support, coronets, airlift, force extension, and dual-role.[20] Tankers enable

[20] Air Force Doctrine Document 2-6.2, *Air Refueling*, 19 July 1999, details these missions.

aircraft to fly nonstop from the United States to any location on the globe and return. The benefits are threefold. First, tankers eliminate requirements for landing rights in foreign countries. Secondly, they reduce the need for intermediate basing to refuel and maintain aircraft. Thirdly, they maximize aircraft payloads, either airlifters or combat aircraft, without sacrificing range.

Tankers also perform four operational and tactical missions: theater support, special operations support, search and rescue support, and emergency refueling.[21] Tankers provide military aircraft with a longer airborne endurance, both operationally and tactically, which results in reducing their regeneration time.

The Air Force acknowledged the critical importance of these tasks in the following statement:

> "Faced with the potential of reduced overseas bases for all US forces, the concept of global reach becomes increasingly important and highlights the aerial tanker as a critical asset in meeting future needs. Air Force tankers refuel Air Force, Navy, Marine and many allied aircraft, leveraging all service capabilities on land, sea, and in the air. Aerial refueling increases the range, on station times, and ordnance capabilities of receiving aircraft — true force multiplication . . . The increased emphasis on rapid response and global reach will only enhance the value of our tanker force."[22]

In short, Aerial refueling provides the national command authorities with a wider range of military options.

Airlift

Air mobility components perform airlift missions in support of strategic, operational, and tactical objectives. Strategic lift transports cargo and passengers between the United States and theaters of operation, as well as between theaters of operation, a function referred to as inter-theater airlift. Tactical airlift transports cargo and passengers within a theater of operations, a task referred to as intratheater airlift. Airlifters perform five missions: routine passenger and

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[21] *Ibid.*

[22] Department of the Air Force White Paper, *The Air Force and US National Security: Global Reach—Global Power,* Air Force Doctrine Document 2-6.1, *Airlift Operations,* 13 November 1999, 3.

cargo movement, exercise and contingency operations, special air missions, aeromedical evacuation, and special operations support. [23]

Airlift Programs

In addition to meeting the need to transport military forces, the Department of Defense relies on airlift for the daily requirements of defense business during peacetime. As in any global organization or business, the demands for airlift have increased due the nature of aerial lines of communication, or ALOCs, which can transport material and people around the world in a matter of hours. Air Mobility Command is the primary command responsible for airlift within the defense transportation system. To meet the increasing demand, numerous types of missions work synergistically to provide defense planners and commanders with the capabilities to move rapidly anything, anywhere over the planet. The Air Force acknowledges the importance of airlift as noted in its doctrine:

> "Airlift is an important national resource and plays a key role in any US response to counter threats to its national security. More than just airframes and aircrews, it is a seamless and responsive system providing the NCA and combatant commanders the airlift necessary to move personnel and cargo anywhere, any time. Capable of responding to any tasking across the spectrum of operations and under a variety of conditions, airlift is a vital component of rapid global mobility."[24]

Air Mobility Command administers numerous airlift programs to meet the challenge of a growing demand for airlift with reduced airlift assets. Commercial carriers under Air Mobility Command contract and execute many of these programs.

Routine airlift sorties meet the transportation requirements to deploy, sustain, and redeploy military forces. In non-routine situations, Air Mobility Command first validates the request and then, based on the requirements, satisfies the request through one of the many programs that it administers. Below are descriptions of eight airlift programs that enhance Air Mobility Command's mission management of airlift missions.

[23] Air Force Doctrine Document 2-6.1 details these missions.
[24] *Ibid*, 16-17.

Channel Missions

A hub-and spoke system, similar to the airlines system, maintains over 500 routes worldwide to routinely transport passengers and cargo internationally and within a theater. Air Mobility Command schedules both military aircraft and contracted-commercial aircraft for these missions. Channel missions operate daily, but the frequency of individual routes depends on the volume of cargo and passengers.

Special Assignment Airlift Missions

Air Mobility Command operates special assignment airlift missions to satisfy unique requirements for pickup and delivery at locations other than those established within Air Mobility Command's channel structure. Assignment of these missions considers the number of passengers, urgency or sensitivity of the mission, weight and size of the cargo, special characteristics of the cargo, and any other special characteristics of the mission. Special assignment airlift missions, to transport nuclear weapons, receive prioritization through the joint chiefs of staff priority system.

Air Mobility Express

The majority of equipment and materials will move on channel missions. However, at the request of a combatant commander, often during contingency operations, United States Transportation Command may establish an express service called "air mobility express," to move equipment and materials directly to a the combatant commander's area of responsibility. air mobility express uses new routes to transport materials and equipment directly to a new distribution center which the theater commander must first establish.

Commercial-Carrier Contract Programs

Air Mobility Command contracts with commercial carriers to perform the majority of passenger and bulk cargo deliveries. The contracts execute five airlift programs: worldwide express, domestic small package, city pairs, tenders and category contracts.[25] Air Mobility

[25] USTRANCOM Handbook 24-2 details these missions.

Command executes 18 different categories of airlift through contracted commercial carriers.[26] Transportation Command employs these programs to transport most of the US Army's Class IX supplies, spare parts, which is the Army's top airlift priority.

Demands on Airlift

The daily demands for mobility air forces are vast. This chapter has outlined the background to understand the complexities and intricacies of the Air Force's largest and most diverse command, Air Mobility Command. United States Transportation Command meets the needs of the defense transportation system, with Air Mobility Command as a vital component of that system. Air Mobility Command's air mobility system comes into focus as a force multiplier for the Department of Defense. Air Mobility Command performs eleven tanker missions and five airlift missions through the execution of eight airlift programs in order to manage its growing airlift requirements. The rapid global response provided by airlift and the versatility and flexibility that tankers provide place many demands on Air Mobility Command's force structure.

[26] *Air Mobility Command, Command Data Book.* Scott AFB, Illinois: Air Mobility Command, Quality and Management Innovation Flight, November 1999, 105-106.

CHAPTER 3

FORCE STRUCTURE REQUIREMENTS

> *The ability to move our forces rapidly and in the right configuration is key to their effectiveness. Most importantly, the greater their mobility, the greater their protection.*
>
> *National Defense Panel Report, 1997*

Planning Deployments

The force structure requirements for mobility air forces depend on many questions that emanate from a decision to deploy military forces to a theater of operations. The first four questions revolve around the nature of the conflict: Who are the aggressors? What does the national command authority want the military to accomplish? How much warning will the military have? Will military forces work in coalition, alliance, or alone? The fifth question asks which military forces would deploy first. The final set of questions revolves around transportation. For example, will military and commercial transportation be available when needed, and will the modes of transportation perform as expected? This last set of questions raises debates about how much lift is enough.

When planning deployments for potential operations, TPFDD planners decide how to allocate resources for lift because acquiring enough mobility forces to cover all possible contingency operations would be too costly. Airlift requirements, however, established by TPFDD planners during the Cold War provide an example. During the Reagan administration of the 1980s, the Department of Defense set a goal to acquire enough airlift assets to transport 66 million ton-miles per day, which was over twice the capacity at the time. In trying to achieve that goal, Congress authorized funds to acquire both C-5Bs and KC-10s as well as develop the C-17.[27] In 1979, Air Mobility Command planned to acquire 210 C-17s, but in April 1990, it reduced that number to 120 because of the change in the threat.[28] According to the Department of Defense, the 66 million ton-miles per day would provide insufficient airlift capacity to meet mobility requirements for a conflict with the Soviet Union, but they lowered the airlift

[27] US Congress, *Moving US Forces: Options for Strategic Mobility*. Washington D.C.: Congressional Budget Office, February 1997, 46.
[28] US Congress, *Military Airlift Options Exist for Meeting Requirements While Acquiring Fewer C-17s,* 59.

requirement anyway to comply with financial restrictions.[29] During Operation Desert Storm, US Central Command estimated that it would employ airlift at the average rate of 33 million ton-miles per day in transporting only 17 percent of the US military forces.[30]

Two Major Theater Wars model

The questions revolving around strategic mobility are more prevalent today than during the Cold War because of the numerous operations that mobility air forces currently perform around the globe. During the Cold War, conversely, strategic mobility focused on the needs for a conflict against the Soviet Union.

The Mobility Requirements Study Bottom-Up Review Update, or MRS BURU, is the most recent study on mobility requirements. The MRS BURU focused on two major-theater wars because military planners believe that this model would place the greatest demands on strategic mobility. In contrast to the MRS BURU, this study proposes to determine future lift requirements, based on Air Mobility Command's steady-state operations because the pace of these operations overlap each other and seldom does that pace slow down. This study recognizes that should a single major-theater war occur, these steady-state operations would have to cease in order for Air Mobility Command to perform the required airlift into the theater of operations.

The MRS BURU developed scenarios where rapid global mobility first halts each enemy air advance before friendly forces initiate a counteroffensive.[31] MRS BURU analyzed the benefits of transporting combat forces by estimating the risk to friendly forces when airlifting them into theater versus slower means of deployment. There are many uncertainties in any analysis of mobility requirements, and some mobility experts believe that analysis alone cannot determine the requirement for airlift because operations are seldom executed as planned.[32] For example, during the deployment for Operation Joint Endeavor, the TPFDD changed, on average, 14 times a day.[33]

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[29] US Congress, *Moving U.S. Forces: Options for Strategic Mobility*, 46.
[30] Dr. Eliot A. Cohen, *Gulf War Air Power Survey, Volume III, Logistics and Support*. Washington D.C.: US Government Printing Office, 1993, Vol. III, 75.
[31] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update*, Introduction, I-2.
[32] David Kassing, "Strategic Mobility in the Post-Cold War Era," in Paul K. Davis, ed., *New Challenges for Defense Planning,* MR-400-RC. Santa Monica, Calif.: RAND, 1994, 671.
[33] Joint Publication 3-35, III-30.

Under the two major theater wars model espoused in the MRS BURU, the national command authorities should decide how much the United States will pay to lower the risks incurred with deploying forces abroad. The Congressional Budget Office suggested that TPFDD planners focus on the minimum number of forces that they believe will meet the needs of two major theater wars without weighing the risks and costs of alternative levels of airlift capacity.[34]

In 1995, the Clinton administration recommended acquiring 120 C-17s for strategic airlift.[35] Air Mobility Command compared costs and capabilities of the C-17, the C-5D, and the C-33, which is a military airlift version of the Boeing 747-400.[36] In addition, Air Mobility Command conducted the Strategic Airlift Forces Mix Analysis to compare the relative performance of a fleet of 120 C-17s against a mix of C-5D fleets and C-33 fleets in combination with fewer C-17s.[37] That study determined that certain combinations of C-17s and a mix of other airlift fleets could transport almost as much cargo to major regional conflicts as a fleet of 120 C-17s. However, the study also determined that although some mixed fleet combinations were less expensive, when they considered the constrained maximum-on-ground time conditions prevalent during Operations Desert Shield and Desert Storm, the study favored the maneuverability of the C-17.[38] Furthermore, the mixed fleet combinations could not transport as much outsized cargo as the Fleet of C-17s.[39] Additionally, the mixed fleets with C-33s would require special aircraft loaders that could reach the height of the cargo floor of a 747.

Incongruity of TPFDD Planning

One challenge in establishing the requirements for strategic mobility is the difference in approaches among TPFDD planners. Combatant planners seek to minimize risk whereas mobility planners seek to optimize all mobility assets: air, land, and sea.[40] Drawing from lessons learned, combat planners seek to minimize risk by planning to flow forces with all their equipment into theater faster using airlift. In preparation for Operation Desert Storm, General

[34] US Congress, *Moving U.S. Forces: Options for Strategic Mobility*, 46.
[35] *Ibid*, 16.
[36] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update*, Annex C, c-1.
[37] *Ibid.*
[38] US Congress, *Military Airlift Options Exist for Meeting Requirements While Acquiring Fewer C-17s, 19.*
[39] *Ibid, 20.*
[40] Department of Defense, *Report of the Defense Science Board Task Force on Strategic Mobility,* Washington D.C.: Office of the Under Secretary of Defense for Acquisition and Technology, August 1996, 11.

Schwartz requested and received additional military forces before initiating an offensive.[41] During that same time-period General Horner, as the air component commander, had to get air forces to their bases in theater as soon as possible to defend the peninsula against an Iraqi offense while the ground force buildup continued.[42] In contrast, mobility planners seek to move as much outsized and oversized equipment on sealift because of the shortage of outsized and oversized airlift capability. During Operation Desert Shield, the Army coded 65 percent of its equipment for airlift yet this requirement exceeded Mobility Air Command's capability by 300 tons per day.[43] Thus, Transportation Command planners rerouted some oversized and outsized cargo by sea but a backlog of over 10,000 tons of bulk cargo still accumulated.

Combatant planners

In a conflict, the lives of American troops are at risk. Combatant commanders, consequently, seek to minimize risk that their personnel may face on the battlefield. They can achieve this by possessing enough strategic air mobility assets to airlift military forces into theater quickly in order to overwhelm or overpower the enemy. Unfortunately, mobility air forces are scarce, which places regional combatant commanders in an uncomfortable position. Further complicating the planning process, the Department of Defense separates the responsibilities of minimizing risk and the responsibilities of employing military forces. Albeit combatant commanders are responsible to minimize risks to military forces, they are not responsible for the cost of equipping their forces or the cost to transport them. The military services and the secretary of defense control funding for new weapon systems and mobility requirements. So, combatant commanders, when developing their TPFDDs, plan for conflicts assuming that airlift is at no cost and continually available.[44]

Mobility planners

How quickly can strategic mobility forces transport the military forces required by the combatant commander? Mobility plans seek to optimize mobility assets and, in doing so, make a number of operational assumptions. The MRS BURU held the six operational assumptions in establishing air mobility requirements for the two-major-theater-war-construct. The six

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[41] Thomas A. Keaney, and Eliot Cohen. *Revolution in Warfare? Air Power in the Persian Gulf,* Annapolis, Maryland: Naval Institute Press, 1995, 4.

[42] *Ibid*, 3.

[43] James K. Matthews, and Cora J. Holt, *So Many, So Much, So Far, So Fast: United States Transportation Command and Strategic Deployment for operation Desert Shield/Storm,* Washington DC: Chairman, Joint Chiefs of Staff, May 1996, 84-87.

assumptions are a rapid decision process, National Guard and Reserve activation, Civil Reserve Air Fleet activation, open ports and enroute bases, zero attrition during deployment, and two non-simultaneous wars.[45]

Rapid Decision Process. As learned from the Gulf War, clear warning orders from the national command authorities and adequate warning time to deploy are the keys to rapid deployments. Less warning time translates to a greater need for both airlift and prepositioning, in order to transport military forces into theater and halt an enemy offensive. Longer warning time enables Transportation Command to employ more sealift forces.[46] If clear intelligence identifies an enemy force preparing an offensive, and the US national command authorities issue a warning order based on that information, then Transportation Command can begin the deployment process. Unfortunately, neither a clear warning order nor quick decisions were forthcoming before 4 August 1990, when Iraq was threatening Kuwait, which may challenge the reality of this assumption. Intelligence before August 2, 1990, correctly identified Iraqi troops massing on the Kuwaiti border, but these analysts viewed this as an Iraqi attempt to intimidate Kuwait into lowering its oil production.[47] As in most cases in the 20th century, political tension preceded the invasion force, yet the Kuwaiti invasion surprised political leaders.[48] Before 4 August 1990, combatant commanders did not initiate steps for a deployment, presumably because the State Department was still seeking cooperation from the Gulf States to allow US military forces to operate in the Gulf.

Since 1990, Transportation Command, through prepositioning has prepared combatant commanders to respond more rapidly. They activated prepositioned equipment near the Persian Gulf in several recent incidents in which Iraqi forces appeared to be on the move.[49] After Operation Vigilant Warrior in October 1994, the United Nations designated the 32nd parallel as a

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[44] Kassing, *Strategic Mobility in the Post-Cold War Era*, 679-680.
[45] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update*, 2-3.
[46] "U.S. At 'High Risk' of Being Unable to Carry Out Two-War Strategy Until 2006," *Inside the Pentagon,* September 22, 1994, 1-6.
[47] Michael R. Gordon, and Bernard E. Trainor, *The Generals' War: The Inside Story of the Conflict in the Gulf,* Boston: Little, Brown, 1995, 14-20, 26.
[48] Richard K. Betts, *Surprise Attack: Lessons for Defense Planning,* Washington, D.C.: Brookings Institution, 1982, 18.
[49] David Kassing, *Army and Marine Corps Prepositioning Programs: Size and Responsiveness Issues,* PM-378-CRMAF. Santa Monica, Calif.: RAND, April 1995, *25.*

no-drive zone, reinforcing the existing no-fly zone. Thus, any incursion by Iraqi forces south of the 32nd parallel would serve as sign of an offensive.

<u>Guard and Reserve Activation</u>. As noted, the Air National Guard and Reserve provide 46 percent of the military airlift capability. Air Mobility Command also relies on a significant number of personnel to conduct aircraft maintenance and perform aerial port duties. The Army, too, relies on reservists to perform transportation duties, initiate port operations, and load and unload ships. For sealift, the Navy relies pre-dominantly on the merchant marine to man the ready reserve force.

Transportation Command relies on volunteers from the Guard and Reserve even before the president activates them. To maximize the use mobility forces, the president must activate guardsmen and reservists quickly, as well as activating the merchant marines as soon as possible, to get sealift ships under way. Recent history shows that these forces activate to slowly to deploy and sustain forces over the first two to three weeks of a major theater war. During Operation Desert Shield the president did not activate the first reserve airlifter units until 23 August 1990, which was 16 days after deployments were initiated.[50] In 1994, however, the president authorized a limited call-up of reserve units for Operation Uphold Democracy within 24 hours of the Department of Defense's request. During Desert Shield, personnel shortages prevented Sealift Command from filling some of its sealift crews within required times.[51] The declining number of merchant sailors raises concerns that Transportation Command may experience crew shortages when needed, thus delaying deployments. Furthermore, if activation occurs too slowly or too late, problems with loading and unloading could thwart the deployment into theater.

<u>Civil Reserve Air Fleet Activation.</u> As previously noted in chapter one, the CRAF provides Air Mobility Command with 50 percent of its wartime airlift capability. During Operation Desert Shield, the commander of Transportation Command activated stage I of the CRAF within 10 days following initial deployments. However, he was unable to persuade the secretary of defense to activate stage II until five months later, and he never requested stage III

[50] John Lund, Ruth Berg, Corinne Reploge, *An Assessment of Strategic Airlift Operational Efficiency.* Santa Monica, Calif.: RAND, 1993, 30-31.
[51] Thomas McCaffrey, *Ready Reserve Force Contingency Crewing Requirements Study,* Alexandria, Virginia: McCaffery & Whitener, December 15, 1995, ES-1.

initiation. MRS BURU, however, assumed that Air Mobility Command would employ stage II airlifters much earlier in the first war of a two-war scenario. At the beginning of a second war, the MRS BURU assumed activation of CRAF stage III, which may have been optimistic in light of historical precedence.

Activating CRAF stage II upon the initiation of the first operation would increase the amount of cargo delivered. During Operation Desert Storm, CRAF cargo deliveries increased approximately 650 tons per day when secretary of defense activated stage II.[52] During the 1990s, Air Mobility Command encouraged airlines to place more aircraft in both stages I and II. Based on current CRAF enrollment, activating stage II would provide 76 more passenger liners and 57 more cargo aircraft added to the numbers employed through stage I activation.

Open Ports and En Route Bases. In the MRS BURU mobility planners assumed that mobility forces would incur no attrition at either airports or seaports of debarkation because those ports would operate in an environment where friendly combatant forces held naval and air superiority.[53] Air Mobility Command employs foreign nation support to refuel airlifters and change aircrews en route because of the distances to either theater of operations. During Operations Desert Shield and Storm, bases at Zaragoza and Torrejon Spain, in conjunction with Rhein-Main Germany, handled 61 percent of US airlift traffic.[54] Air Mobility Command's enroute structure decreased from 39 locations in 1991 to 12 locations in 1999.[55] The air mobility system operates better when airlifters can land at en route bases because aircrews can rest while replacement crews deliver the cargo to theater and then return the aircraft to the original crew for a follow on mission. When the number of aircrews is limited, the lack of enroute bases reduces strategic airlift capacity by 20 to 25 percent[56] because aircrews are limited as to how many hours they can fly during a given period.[57] Thus, the en route infrastructure examined in chapter four is a critical element of force structure requirements, and constraints on access to aerial ports, seaports, or the air mobility en route infrastructure will delay TPFDD execution.

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[52] Lund, Berg, and Replogle, 13.
[53] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update*, 3.
[54] Lund, Berg, and Replogle, 81-82.
[55] *Air Mobility Strategic Plan 2000*, Infrastructure.
[56] Lund, Berg, and Replogle, 31-35.

Zero-Attrition. This assumption lies in the belief that friendly forces will gain and maintain air and sea superiority during the build up phase of hostilities. The combat assets needed to perform air superiority, however, require mobility assets to put them in place. During Operation Desert Shield, Iraqi forces remained inactive during the coalition forces build up. The MRS BURU assumes that future adversaries will allow the same gracious buildup. Yet, rarely does an adversary permit an uninterrupted buildup of aggressive forces against itself.

Non-Simultaneous Wars. For the United States to prosecute two wars, they would have to begin between one and three months apart.[58] Shortfalls in tanker support and in airlifters would prevent the United States from prosecuting a second war successfully if the second occurred within three weeks of the first.[59] Sealift requirements would also be insufficient if Transportation Command had to move equipment to two major theater wars simultaneously.[60] Without enough time between the two wars, Transportation Command might not be able to regenerate and transfer prepositioned equipment. Thus, simultaneous wars would have a significantly negative implication for mobility requirements.

To maintain a moderate risk for military forces, Air Mobility Command must transport 60 to 70 percent more cargo during the first three weeks of a second war than it transported during the first month of Operation Desert Shield. This proposition emanates from one of the most demanding scenarios depicted in MRS BURU: sustaining operations in Korea while transporting equipment to halt an invasion in the Persian Gulf region.

The MRS BURU estimated the transportation of 5,000 tons daily to an initial operation in Korea during the first 30 days and 5,000 tons daily during the first 15 days to the second operation in the Persian Gulf. These estimates are based on the immediate use of CRAF stage II aircraft. In comparison to Operation Desert Shield, Transportation Command transported 1,700 tons daily during the first month and 3,600 tons daily during its peak, which was January 1991. The two major theater war scenario, estimated to be non-simultaneous, requires far more airlift than was available during Operation Desert Shield.

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[57] Aircrews are limited to flying a maximum of 16 hours per day, 125 hours per 30 days, and 330 hours over 90 days. During Desert Shield, those limits were raised to 18 hours per day, 150 hours per month, and 400 hours per 90-day period due to aircrew shortages in air mobility aircraft to include both tankers and airlifters.
[58] Michael O'Hanlon, *Defense Planning for the Late 1990s: Beyond the Desert Storm Framework*, Washington, D.C.: Brookings Institution, 1995, 7.
[59] Christopher Bowie, *The New Calculus: Analyzing Airpower's Changing Role in Joint Theater Campaigns*, MR-149-AF, Santa Monica, California: RAND, 1993, ix.

Air Mobility Planning

Service Culture

Air Command and Staff College at Maxwell Air Force Base Alabama excludes mobility planning from its curriculum, which centers on planning air campaigns and target selection.[61] One explanation of this exclusion is the fact that airlift and sealift crews often provide transportation for Army troops rather than supporting their own military service. Both airlift and sealift have become the orphans of military planning within the Air Force and Navy, where mobility advocates of both services continually lose institutional battles for funding.[62] Note that service education emphasizes the cutting edge and gives logistics fairly short shrift.

Consensus Planning

Mobility coordination incorporates views from the Joint Chiefs of Staff, the military services, and the secretary of defense, the Transportation Command, the regional commanders in chief. These organizations look at the different modes of lift and decide how to allocate resources. These organizations produce decisions through a committee process, which is a consensus that provides something to each organization.[63]

Airlift Options

The MRS BURU developed scenarios based on the assumptions above. That raises questions because of evidence built in chapters two and three.[64] The MRS BURU developed scenarios to achieve rapid global mobility to sequentially halt each enemy advance and then initiate the respective counteroffensives.[65] Some analysts believe that the MRS BURU ignores the question: How to reduce the risk faced by military forces that arrive in theater first?[66] The MRS BURU, however, identified operational effects and the increased risk assumed under different air mobility options.[67]

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[60] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update*, I-2.
[61] Several ACSC curriculum sources show no course on mobility. In all course and exercises, mobility is assumed to be available in sufficient quantity to perform the operation. Sources include: the 1999 ACSC in-residence curriculum, the ACSC 1999 Cyberbook, the 1997 ACSC Distance Learning curriculum.
[62] US Congress. *Moving US Forces: Options for Strategic Mobility, 49.*
[63] Kassing, *Strategic Mobility in the Post-Cold War Era,* 688.
[64] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update,* 2-3.
[65] *Ibid*, I-2.
[66] Owen Jr. Cote, *Strategic Mobility and the Limits of Jointness*, Center for Science and International Affairs Monograph, Cambridge Mass.: Harvard University Press, 1998, 4-11.
[67] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update,* 3.

The cost of airlift options centered on the number of C-17s in a given fleet, which demonstrated correlation between an increase in MTM/D with the increase in the number of C-17s.[68] Thus, the MRS BURU seemingly proceeded along the assumption that more airlifts available to transport military forces translate into reduced risk incurred by those forces. The result recommended the modernization of mobility air forces with the C-17. The option recommended by the administration was to acquire the smallest possible number of C-17s. Congress funded this recommendation. In an attempt to reduce the risk inherent in this option, Transportation Command increased the amount of prepositioned equipment within Central Command's theater, which carries a smaller price tag than an increased fleet of C-17s.

En Route Infrastructure

Both the MRS BURU and the Strategic Airlift Forces Mix Analysis examine acquisition of the C-17. Neither the C-17 alone nor the C-17 in combination with prepositioning equipment can achieve the rapid global mobility necessitated in Department of Defense mobility requirements. Enroute infrastructure also facilitates mobility, both domestically to bring military forces to ports of debarkation within the US and at ports of embarkation within each theater, in order to bring forces in smoothly. During Operation Desert Storm, both airports and seaports in Saudi Arabia had backlogs because there were too few trucks, 25,000-pound and 40,000-pound loaders, to unload cargo and passengers.[69] These bottlenecks caused an accumulation of huge amounts of equipment and troops that provided the enemy with an attractive target.[70] Thus, it is important to have the necessary loading and unloading equipment to move passengers and cargo within a theater and ensure sure that mobility forces that operate seaports and airports arrive first.

Intelligence is Critical

Knowing the characteristics of ports and airfields worldwide enables planners to consider how much passengers, materials, and equipment can transit through a given port each day. Knowing the capabilities of the enemy as well as the capabilities of any groups that might desire

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[68] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update*, Section V, Table V-1.
[69] Lt Gen William G. Pagonis, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War*, Cambridge, Mass.: Harvard Business School Press, 1992, 46-47.
[70] Department of Defense, *Report of the Defense Science Board Task Force on Strategic Mobility,* 56.

to thwart US mobility operations, to include threats, such as chemical or biological weapons, also provides planners with risk estimates.

Improved intelligence gathering in support of Transportation Command would have helped to smooth mobility operations. During Operation Desert Shield the electronic management system used by theater commanders to coordinate their deployment priorities experienced frequent gridlock.[71] Some of the system's users were unfamiliar with it; others found it so cumbersome that they circumvented it by sending messages for airlift missions direct to Mobility Air Command. As combatant commanders changed deployment schedules, many airlifters took-off before units were ready to deploy, and aircraft took-off in response to a combatant commanders' calls for specific aircraft that were the wrong type of airlifter for the cargo load.[72]

Further compounding the problem was Transportation Command's poor means of tracking cargo loads and passengers. Without that information, combatant commanders reordered equipment and supplies, thus placing even greater demands on the mobility system.[73] Additionally, many containers were without labels, and as port operators held them until they could verify the contents, a backlog grew.

Transportation Command modernized its information systems, with its GTN that is easy to use for both mobility forces and combatant forces. Part of this system includes bar codes on all equipment and containers while in transit. Nevertheless, experts still believe that Transportation Command's system for managing information could better facilitate adjustments to mobility plans more quickly as tactical conditions changed.[74]

Requirements of Four Scenarios

The MRS BURU published in 1995 had a dual focus. On one hand, it used computer simulations of combat and deployments to estimate the number of airlifters, ships, and prepositioning sites that Transportation Command needed to meet specific deployment time-

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[71] Matthews and Holt, 21-22.
[72] *Ibid*, 21-22.
[73] *Ibid*, 27.
[74] James K. Matthews, *General Kross, Commander in Chief United States Transportation Command and Commander Air Mobility Command: An Oral history*. Scott AFB, IL: United States Transportation Command, October 1999, 67-71.

lines. On the other hand, it had to constrain its analysis to be affordable.[75] Thus, the MRS BURU tried to quantify how much risk military forces would incur while achieving military objectives and constraining the cost.

The MRS BURU proposed four scenarios. The first scenario was a single operation in Korea. The second scenario was a single operation in the Persian Gulf. The third scenario was a war in Korea followed by a war in Persian Gulf. The fourth scenario was a war in the Persian Gulf followed by a war in Korea. The MRS BURU identified the heaviest mobility requirements in the second and third scenarios. In the first situation, the MRS BURU foresaw a shortfall in the lift requirement to transport enough forces to halt an offensive and maintain a moderate risk. The study recommended resolution of the shortfall either by purchasing additional airlift planes or by prepositioning additional cargo in the region. The total tonnage of cargo required is classified, but according to unclassified accounts, that shortfall is small enough to fall within the margin of error of the models used to estimate those requirements.[76]

<u>Prepositioning.</u>

The MRS BURU recommended prepositioning more heavy Army equipment and materials to make up for the shortfall that would exist in a single major theater war. In the third and fourth scenarios however, the MRS BURU cites a challenge to prepositioning. If the Army uses the prepositioned equipment for the halt phase in the first war, that equipment would be unavailable for the halt-phase of the second war. Transportation Command must preposition enough equipment in both theaters or regenerate the prepositioned ships after unloading the equipment in the first theater of operations. In the latter circumstance, Transportation Command would have to regenerate the prepositioned ships and send them back to the United States to pick-up a new set of equipment for the halt-phase of the second war.

<u>Airlift</u>

The MRS BURU recommended the acquisition for enough airlifters to transport between 49.4 and 51.8 million ton-miles per day. The exact amount of million ton-miles per day depends on the amount of prepositioned equipment. If Transportation Command can preposition enough equipment, 49.4 million ton-miles per day would suffice to airlift the remaining cargo required

[75] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update*, 2.

for the halt phases of two major theater wars with at acceptable risk. However, if Transportation Command cannot preposition more forces or if the Army’s afloat prepositioning is not held in reserve for a conflict in the Persian Gulf, this study's author believes more airlift is advisable. According to the MRS BURU, the acquisition of 120 C-17s would provide Transportation Command with the 49.4 million ton-miles per day of airlift capability required. In addition, that study suggested that to achieve a higher level of airlift capability, the Air Force would have to acquire more C-17s. Based on the MRS BURU, the Army examined what additional equipment to preposition. From the Army’s examination, consequently, Transportation Command increased the requirement for airlift capability to 49.7 million ton-miles per day, of which the CRAF would produce.[77]

Sealift

The MRS BURU concurred with a 1992 mobility requirements study that recommended two acquisitions to modernize sealift capabilities. The first acquisition was for 19 Large Medium-Speed Roll-On/Roll-Off Ships or LMSRs, some of which Transportation Command could use to preposition equipment. The second acquisition was to establish a fleet of 36 smaller Roll-on/Roll-off ships for the Ready Reserve Force. Once the Navy acquired these, they could remove several older breakbulk ships from the Ready Reserve Force. The MRS BURU also recommended relying on the commercial shipping contracts to sustain supplies in both theaters, estimating a requirement for 6,000 to 6,500 20-foot-equivalent containers per week to carry cargo, plus 13 to 16 containerships to deliver ammunition.

Cost

Airlift is the most expensive of the three options, but provides the most rapid means for global mobility. Consequently, the decision is twofold. The first question asks, what forces must move rapidly for immediate use versus what military forces can follow-on later? The second question refers to those military forces that must move rapidly and asks what equipment must Transportation Command preposition versus what they must airlift. Concerning the first question, a decision that requires fewer rapid-reaction forces and more follow-on forces

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[76] Elaine M. Grossman, "OSD Debates How to Explain Military's Difficulty with Two-War Strategy," *Inside the Pentagon*, January 26, 1995, 1-10.

increases the cost to the Navy and reduces the cost to the Air Force. Concerning the second question, a decision that requires more prepositioned Army equipment and fewer airlifters raises the cost to the Army and lowers the cost to the Air Force.

This line of thinking raises additional questions as to what options the services support. For example, the Air Force may support the prepositioning of equipment because it reduces its cost, and if it has other priority aircraft to acquire, the Air Force can pursue them rather than acquiring more airlifters.

Halt-Phases

How quickly can mobility forces transport cargo in each scenario? Sealift would transport the first military forces within three weeks to halt an enemy attack in the Persian Gulf.[78] The halt phase places the greatest demands on airlift and prepositioning. The halt phase of a second theater war, if overlapping the first theater war, would challenge Transportation Command's airlift capacity beyond its capability. Transportation Command would have to transport heavy units to the second theater while transporting cargo to sustain operations in the first theater. The director of operations and logistics for Transportation Command, then Maj Gen Charles Coolidge, stated: "We have a one-major-theater-war force to fight a two-major-theater-war strategy."[79]

Airlift Capability

Another important measure of capability is the amount of outsized cargo that the operations of two major theaters require in wartime. The current airlift capacity is 11 percent short of the minimum requirement of 49.7 million ton-miles per day established by MRS BURU.[80] Air mobility Command's actual total capacity is 43.9 million ton-miles per day, which is a 5.8 million ton-miles per day shortfall.[81] Commander-in-chief of Transportation Command, Gen Tony Robertson, cited three major causes for the shortfall. First was the C-5 reliability

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[77] US Congress, *Moving U.S. Forces: Options for strategic Mobility,* 52.
[78] *Ibid*, 52.
[79] Bryant Jordan, "Overloaded; Can the Airfleet Handle Two Wars at Once? By all Forecasts, No." *Air Force Times*, Vol. 60, no. 4, Springfield, Virginia: Army Times, 30 August 1999, 14.
[80] During the US Senate Strategic Lift Hearing in March of 1999, commander-in-chief of Transportation Command, Gen Tony Robertson, responded to Committee Chairman, Senator James Inhofe's (R-OK) question by noting an 11 percent shortfall in meeting the 49.7 MTM/D. Defense Transportation Journal, June 1999, 26.
[81] Col Michael Fricano, "Future Directions of Air Mobility." *Mobility Requirements Study 05.* Slide presentation at the December meeting for the Maxwell Chapter of the Airlift Tanker Association, 13 December, 1999, 5.

where 2.7 million ton-miles per day of this shortfall is due to the low C-5 mission capable rate, which equates to about 50 percent of the total shortfall.[82]

The Second reason for the airlift capacity shortfall was the C-141 draw down. The MRS BURU made its 49.7 million ton-miles per day recommendation based on the number aircraft in the C-141 fleet remaining the same. When Air Mobility Command accomplished this study in 1994, all C-141s were undergoing repairs to lengthen the fleet's service life.[83] Since then, Air Mobility Command accelerated the retirement of the C-141 fleet due to airframe fatigue that the depot cannot repair. Consequently, the number of C-141s in the fleet decreased from 249 following Operation Desert Storm to 74 as of 18 Oct 1999 (See Figure 3.1).[84]

The third reason for the shortfall was the fact that the increasing operations tempo of the mobility air forces outpaces C-17 acquisition program. During fiscal year 1994, when the JCS accomplished the MRS BURU, the operations tempo of the mobility air forces rose approximately 20 percent.[85]

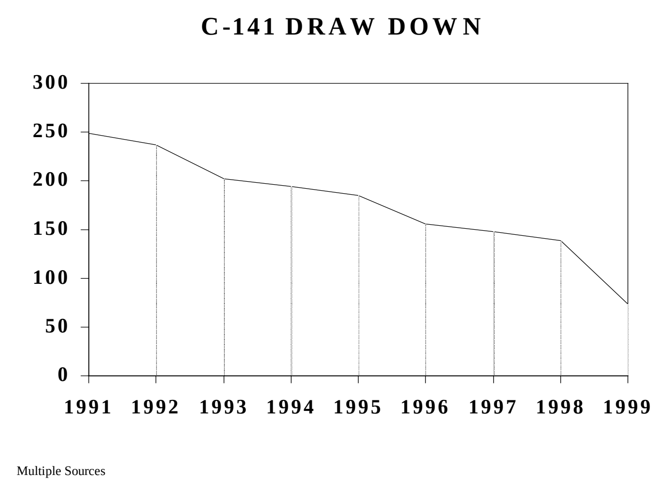

Figure 3.1

[82] *Ibid*, 5.
[83] *1998 Air Mobility Master Plan*, 5-18 to 5-22.
[84] Department of the Air Force, *United States Air Force Statistical Digest, Fiscal Year 1996*. Pentagon, Washington D.C.: Assistant Secretary of the Air Force for Financial Management and Comptroller, 1997, 94; *Air Mobility Command, Command Data Book*, 11.
[85] James Kitfield, "Airlift at High Tempo" *Air Force Magazine*, Vol. 78, no. 1, Arlington, Virginia: Air Force Association, January 1995, 59.

Changing TPFDD Schedules

The planning of the Gulf War provides an example. In the fall of 1989, General Norman Schwartzkopf, then commander in chief of US Central Command, began revising military plans to prepare against a possible Iraqi offensive into Kuwait and/or Saudi Arabia.[86] His TPFDD was incomplete when Iraqi forces invaded Kuwait on 4 August 1990. Central Command planners, consequently, draw up an operational plan amidst a rapidly changing situation.

Today, combatant planners develop operational plans for several possible contingencies in order to be prepared when an enemy initiates an offensive. This lengthy process can take over a year to complete. Unfortunately, planners are unable to anticipate every contingency, and armed conflicts usually follow a script other than planned. Combatant commanders might prefer the Air Force to acquire enough mobility air forces to give them flexibility in changing their TPFDD schedules to stay ahead of changing situations.

Prepositioning and sealift options constrict a combatant commander's flexibility because he needs to select which units to preposition long before any armed conflict occurs. Whereas a larger mobility air force would provide more flexibility to make last minute changes that would enable a combatant commander to stay ahead of the enemy. Thus, mobility air forces provide the flexibility that a combatant commander needs to improve his chances to halt an enemy offensive while incurring less risk to friendly military forces.

Risks to Friendly Forces

The MRS BURU assumed that deployments would occur in a secure environment. Since Transportation Command would move so many forces to a theater after an enemy attack, that enemy would have a strong incentive to slow deployments by targeting seaports and airports. An enemy could also mine ports; destroy runways; hit airport and seaport facilities, planes, and ships; and employ special-operations forces. As more countries continue to develop longer-range missiles, an enemy could target airports and seaports with chemical, biological, or nuclear weapons as well.

Mobility forces would be more vulnerable using sealift than airlift. Prepositioned ships and sites, as well as LMSRs, carry more equipment and materials than does an airlifter. If the

[86] Matthews and Holt, 19.

enemy destroyed a prepositioned ship or site, or an LMSR, a greater percentage of warfighting material would be lost than if the enemy destroyed an airlifter. Additionally, if the enemy destroyed a runway or airport, the flow of cargo would simply divert to an alternate airport. Seaports provide lucrative targets versus airports because of the large volume of cargo that a ship unloads. A lack of suitable ports could complicate a deployment dependent on sealift. During Operations Desert Shield and Desert Storm, Transportation Command transported 96 percent of sealift cargo to just two ports, and five airports across the Arabian Peninsula received 78 percent of airlifted cargo.[87] Sea-lines-of-communication and choke points are more vulnerable than air-lines-of-communication and en route airports. If sealift ships deploying to the Persian Gulf were unable to transit the Suez Canal, the trip around Africa would add a week to TPFDD schedules. Airlifters conversely, can divert around a hostile area, if needed, in a matter of minutes or hours. However, if friendly naval forces control the sea in those areas needed for sealift transit, sealift becomes the most cost-advantageous means of cargo deployment. The current commander-in-chief of Transportation Command identifies the risk level of forces flowing into a major theater war as medium to high, whereas the MRS BURU sought to establish a low risk level.[88]

Two Important Factors

In examining of the force structure requirements for Air Mobility Command, two important factors emerged. First, this evaluation of the two-major-theater-wars scenario identified shortfalls in the required airlift capability. The minimum requirement for airlift is not currently available in accordance with force structure requirements established. Secondly, this chapter pointed out that the risk to friendly forces during the deployment to two theaters of operation is higher than combatant commanders would like and increasing airlift could reduce that risk. Due to reduced airlift capacity, the Department of Defense estimates the current level of risk at medium to high.

[87] Department of Defense, *Report of the Defense Science Board Task Force on Strategic Mobility,* 56.
[88] Jordan, 14.

CHAPTER 4

Current Force Structure

> *We have learned and must not forget that from now on air transport is an essential element of airpower, in fact, of all national power. We must have an air transport organization in being capable of tremendous expansion.*
>
> *General Hap Arnold, 1945*

Air mobility Command's actual total capacity is 43.9 million ton-miles per day, which is a 5.8 million ton-miles per day shortfall of the two-major-theaters-wars construct.[89] To understand how the force structure translates into airlift capability, it is important to know the factors involved in determining the million ton-miles per day measurement to include aircraft utilization rates and cargo classifications. Next, it is important to understand the mission capable rates of the major Air Mobility Command airlift and tanker airframes in order to explain why the force structure of Air Mobility Command achieves only 43.9 million ton-miles per day. Finally, an examination of Air Mobility Command's enroute infrastructure will identify additional force-structure limits in the throughput passengers and cargo.

Million Ton Miles Per Day

Air Mobility Command measures airlift capacity as million ton-miles per day, which allows for quick comparisons. The formula for determining million-ton-miles-per-day is the mathematical product of four factors: objective utilization rate, blockspeed, payload, and a productivity factor.[90] The first factor, the objective utilization rate, commonly referred to as UTE, is the average flight hours per day flown by aircraft in primary aircraft authorization in service assigned to flying squadrons. The second factor, blockspeed, is the average ground speed in nautical miles per hour from takeoff to a block distance of 2,500 nautical miles. Air Mobility Command bases the third factor, payload, on the average payload per aircraft as experienced during both Operations Desert Shield and Desert Storm. The fourth factor, productivity, takes into account the aircraft returning from its offloading location to its next on-loading location, which varies depending on the distances to these locations.

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[89] Fricano, 5.
[90] *1998 Air Mobility Master Plan*, 2-26.

Unfortunately, several factors are too circumstantial to consider when determining million-ton-miles-per-day calculations. These wide ranging factors include timing restrictions, unit integrity for air mobility flying squadrons, system interactions, infrastructure constraints, and the differences between cargo classifications. The most important factors in understanding the limits of airlift capability are aircraft UTE rates and cargo classifications.

UTE rate. Calculations for UTE rates encompass many characteristics. Each aircraft has two UTE rates: surge and sustained, where surge is the first 45 days of an operation, and sustained is the time period from when surge ends until operation termination.[91] After the surge rate ends, the flying rate decreases to the sustained rate in order for maintenance personnel to perform repairs and conduct aircraft inspections.

Other characteristics define UTE rates too. Air Mobility Command assigns each type of airframe an objective UTE rate based on the fleet characteristics of that aircraft and aircrew employment per aircraft. To determine fleet characteristics, Air Mobility Command calculates reliability, maintainability, performance, ground handling, and loading characteristics of each type of airframe. To compute aircrew employment per type of airframe, Air Mobility Command uses only 86 percent the total number of aircrew trained and qualified for flying duty because 14 percent of aircrews are on temporary duty assignments, ill or on leave.[92] Further restricting aircrew use, Air Force regulations limit aircrew flying hours to only 150 hours in a 30-day period and 400 hours in a 90-day period. Aircrew employment factors also assume a 25 percent volunteer rate among Air National Guard and Air Force Reserve components. Furthermore, UTE rates depend on several characteristics to include: location, enroute support capabilities, air traffic control restrictions, ramp space, crew ratio, and component make up of the force structure.

Cargo Classifications

Air Mobility Command employs three classifications due to size characteristics of loads, which limits the choice of airframes available to transport classifications of cargo as the size increases. The first classification, bulk cargo, is general cargo loaded onto standard size pallets that are 108 inches by 8 inches, or into containers. A number of different airframes, including both military and commercial aircraft, commonly transport bulk cargo. The second

[91] *1998 Air Mobility Master Plan,* 2-27.
[92] *Air Mobility Strategic Plan 2000*, 2.4.1.

classification, oversized cargo, is larger than bulk, but less than outsized cargo. Two criteria define oversized cargo: palletized with an extended height of 96 inches; or cargo with maximum dimensions of 105 inches in height, 109 inches in length, and 117 inches in width.[93] Currently, the only aircraft capable of carrying oversize cargo are the C-5, C-17, C-141, KC-10, and C-130.[94] The third classification, outsize cargo, exceeds the dimensions of oversized cargo and requires either a C-5 or C-17 for transportation. Due to the aircraft availability restrictions on larger cargo classifications, they play an essential role in determining whether or not Air Mobility Command meets its mobility objectives.

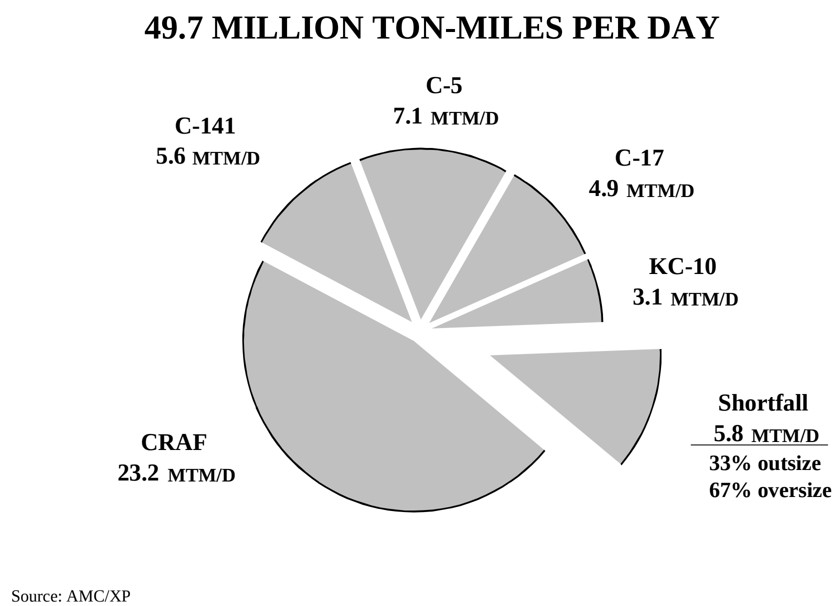

Figure 4.1

Two cargo classifications make up the 5.8 million ton-miles per day shortfall: 33 percent outsize and 67 percent oversize (see figure 4.1). This situation occurs because of the restricted cargo capabilities of the airframes at Air Mobility Command's disposal and limited number of airframes capable of transporting outsize and oversize cargo. The director of plans and program for Air Mobility Command airlifters has divided the airlift fleet into three categories. The first category includes both the C-17 and the C-5 because they are capable of carrying bulk, outsize, and oversize cargo. The second category includes both the C-141 and KC-10 because they are

[93] *Ibid*, 2.3.1.1.
[94] Fricano, 6.

capable of carrying bulk and oversize cargo. The third category includes commercial aircraft because they can only carry bulk cargo due to their low wings, high bodies, and small doors.[95]

Mobility Aircraft

Total airlift capability at the 43.9 million-ton-miles-per-day requires all components to perform, where CRAF members provide 50 percent of airlift capability through contracts. The Air National Guard coupled with the Air Force Reserve conduct an additional 23 percent of airlift capability, and active duty forces perform the remaining 27 percent of airlift capability.[96]

As noted in chapter two, Air Mobility Command's capability to achieve the MRS BURU objective of transporting 49.7 million ton-miles per day falls short. The main reason for this shortfall boils down to a lack of mobility airframes. Air Mobility Command expects a decrease in number of airlifters in service. During Operations Desert Shield and Desert Storm, Transportation Command relied on nearly 350 military airlifters, and as of 18 October 1999, Air Mobility Command's primary aircraft authorization (PAA) for airlifters was only 273.[97] Air Mobility Command also experienced a reduction of tankers in service. In 1991, Strategic Air Command, who owned all tankers at that time, had a PAA of 648 tankers.[98] In 1992 all tankers were subsequently transferred to Air Mobility Command, and by 1999 the PAA for tankers was down to 474 tankers, of which 50 percent transferred to the Air Force Reserve.

Aircraft mission capable rates are a primary factor in calculating million-ton-miles-per-day. In fiscal year 1997, the mission capable rate for Air Mobility Command was 66 percent, and for the first quarter of fiscal year 1998, logistics data shows an mission capable rate of about 63.5 percent.[99] A closer examination of each fleet brings this concept into focus.

C-141 Fleet

The C-141fleet is the backbone of strategic airlift, yet only contributes 5.6 million ton-miles per day of the MRS BURU objective of 49.7 million ton-miles per day. A fleet of 266 C-

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[95] Stucker, James P. *Analyzing the Effects of Airfield Resources on Air lift Capacity*, Santa Monica, California: RAND, 1999, 55.
[96] USTRANCOM Handbook 24-2, 5.
[97] *Air Mobility Command, Command Data Book*, 12.
[98] Department of the Air Force, *United States Air Force Statistical Digest Fiscal Year 1996*, 95-98.
[99] Fricano, 57.

141 airlifters transported cargo during operations Desert Shield and Desert Storm.[100] The C-141 can transport 13 pallets a distance of 3,130 nautical miles, and when aerial refueled, it can fly anywhere in the world.[101] Unfortunately, the C-141 has reached the end of service, and the fleet's retirement is in progress and scheduled for completion by 2006.[102]

C-5 Fleet

In a fully loaded configuration, the C-5 can transport 36 pallets and 73 passengers, but requires aerial refueling to go beyond its fully loaded range of only 830 nautical miles.[103] However, with aerial refueling the C-5 should transport 13.2 million-ton-miles-per-day at the required 75 percent mission capable rate. However, the fleet's mission capable rate declined from 71 percent in 1992 to 59.4 percent, which results in a 7.07 million-ton-miles-per-day average.[104] Thus, mission capable rates of a fleet of airframes directly effects million-ton-miles-per-day capability. Nearly 50 percent of the previously mentioned million-ton-miles-per-day shortfall, 2.7 million-ton-miles-per-day, resulted from the C-5's poor mission-capable rate. Unfortunately, because of the declining C-5 mission-capable rate, this shortfall will continue to exist if Air Mobility Command does nothing.

To improve performance of the C-5 fleet, Air Mobility Command proposed a C-5 Reliability Enhancement and Reengineering Program that includes, among numerous other items, engine replacement. The new high-pressure turbine engines will work to 2,500 hours, which is more than twice the current engine life of 1,200 hours. In addition, the enhancement program would increase the mission capability rate to 75 percent. A C-5 review team, consisting of members from NASA, the Federal Aviation Administration, and the Air Force, concluded that, due to the structural integrity of the C-5 airframe, its service life could last until 2040 with proper fleet management.[105] Air Mobility Command projects that the cost savings of the C-5 enhancement program, as compared to the purchase of a new airframe, will be $4.4 billion when spread over the projected life cycle of the fleet.[106]

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[100] Department of the Air Force, *United States Air Force Statistical Digest Fiscal Year 1996*, 95-97.
[101] *Air Mobility Command, Command Data Book*, 5.
[102] *Air Mobility Strategic Plan 2000*, 2-29.
[103] *Air Mobility Command, Command Data Book*, 5.
[104] Fricano, 57.
[105] *Ibid*, 62.
[106] *Ibid*, 66.

C-17 Fleet

The growing C-17 fleet will become the new backbone of airlift for Air Mobility Command.[107] Currently, the C-17 contributes 4.9 million ton-miles per day to the total airlift capability.[108] The MRS BURU relied on the Strategic Airlift Forces Mix Analysis, conducted by Air Mobility Command, for its recommendation of 120 C-17s to meet Air mobility requirements.[109] Unfortunately, this recommendation excluded consideration of the airlift requirements for special operations that calls for 15 additional C-17s.[110] Also noteworthy is the fact that Air Mobility Command originally sought 210 C-17s.[111]

The C-17 has a 90 percent mission-capable rate, with the capacity for 18 pallets or 102 passengers that will eventually provide approximately 14 million-ton-miles-per-day once all 120 are in service.[112] As additional C-17s enter service in PAA billets among different squadrons, the outsized and oversized cargo shortfall should subside.

The C-17 has range limitations because development was a compromise. By building an aircraft with a footprint of the C-141 that could carry outsized cargo, the Air Force sacrificed range. Thus, the C-17 has short range for a strategic airlifter, which makes it very tanker intensive when fully loaded. To resolve this situation Air Mobility Command proposed adding extended range tanks that would provide an additional 67,000 pounds of fuel in an added center-wing fuel tank. This new tank will add range to the C-17, which in turn will reduce the C-17s dependency on tanker support or enroute refueling stops. The C-17-system program director feels that current program funds can absorb the modification cost. If the program director is correct, deliveries of aircraft with the new tanks could begin in July 2001. The additional fuel tank will consequently reduce the C-17s need for tanker assets which, as explained later, relieves the overburdened tanker fleet.

Another C-17 limitation is its inability to perform direct delivery on a continuous basis on a dirt runway. C-17s can direct-deliver to a concrete runway on a continuous basis, but can only deliver cargo to a dirt runway only once, maybe twice, because of the physical properties of

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[107] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update*, C-1.
[108] Fricano, 6.
[109] US Congress, *Military Airlift: Options Exist for Meeting Requirements While Acquiring Fewer C-17s*, 4.
[110] *Air Mobility Strategic Plan 2000*, 2.4.1.1.
[111] Matthews, 62.
[112] *Air Mobility Command, Command Data Book*, 6; Fricano, 21.

dirt.[113] After the first landing, the landing wheels of the aircraft cut into the surface of the airstrip. The next aircraft landing cuts more ruts into the surface and so on until finally, the airstrip is too torn up to land on. The C-17 however, can provide continuous flow using concrete-capped runways, which the Army Corp of engineers can build within days and at little cost.[114]

A proposal by Boeing seeks to increase the total number of C-17s from 120 to 180. This proposal would incur a new multi-year procurement contract that would give longevity to the production line of C-17s. This increased production would reduce the manufacturing cost of the C-17s purchased under the proposed new contract to approximately 75 percent of the C-17s current 80 aircraft acquisition program.[115] The lower price of $149 million per aircraft hinges on a 15 aircraft per year production rate. The acquisition program does not take advantage of lowest cost per aircraft production, which is 15 aircraft per year.

C-130

The C-130 is Air Mobility Command's core intra-theater airlifter and comprises the Air Force's most variant fleet with 21 different models and variants within the fleet, which creates several problems.[116] First, The Air force must provide funding to support what totals 45 different configurations among the 21 variants of the fleet. Secondly, Air Mobility relies on Air Education and Training Command to provide basic C-130 training to its crews in C-130Es. Following C-130 basic training, specific units must conduct excessive in-unit training in order to account for all the differences between the aircraft, which creates an abnormally large training bill for those units.

The third problem is a lack of interoperability. For example, a crewmember that flies a C-130E can not fly a C-130H3 because they are different aircraft. Sixty-three percent of the fleet is in the Air National Guard and the Air Force Reserve. When a mix of active duty, guard, and reserve forces support an operation, they form rainbow units at their deployed location, which result in manning and scheduling problems. Differences in equipment types cause crew qualification differences that create a situation where C-130 crews are not interchangeable.

[113] Matthews, 63.
[114] *Ibid*, 64.
[115] Fricano, 39.
[116] Fricano, 84.

Thus, the differences influence operational effectiveness of the force, which constrains the theater commander's operation. Furthermore, each type aircraft requires unique maintenance, unique MSRP kit construction, and unique support equipment.

The C-130 fleet is also an older fleet that requires upgrading. Ninety-three percent of the active-duty aircraft are older than 1978. Whereas, sixty-nine percent of the Air National Guard aircraft are newer than 1978 and 74 percent of the Air Force Reserve aircraft are newer than 1982. Support for this aging fleet is increasing at 17 percent annually. In addition, mandated navigation and safety requirements drive the need to update avionics.

Air Mobility Command is seeking procurement of two additional models. The C-130X model, whose large-scale production would reduce the number of variants in service. Production of the new J-model will provide improved C-130 performance, which will provide improved capabilities over the current C-130E model. The J-model will have the option to carry 2 more pallets, 23 more medical litters, 36 more combat troops, or 28 more paratroopers than the C130E model. By 2013, Air Mobility Command desires only two primary avionics configurations: the C-130X and the C-130J. Special operations aircraft may share common avionics with the C-130X and have additional equipment for their specialized missions.

KC-10 Fleet

The KC-10 is Air Mobility Command's newest fleet of aircraft, where the average of the fleet is 16 years old.[117] The KC-10 is a modified DC-10 commercial aircraft that can carry a maximum cargo weigh of 55 tons on 27 pallets, and its maximum load carrying capability is 170 tons, which could be all fuel or fuel and cargo combined.[118] As is the case with commercial aircraft, the KC-10 requires special loading equipment to lift cargo high enough to reach the floor of the aircraft. Out of 54 KC-10 aircraft, Air Mobility Command plans to augment its airlift fleet with 37 of them during a single theater war, contributing 3.1 million ton-miles per day to the total airlift capacity.[119] Thus, only 17 KC-10s will be available as tankers during a major theater war, where the operations tempo would dictate a need for more tankers.

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[117] Tammar A. Mehuron, *USAF Almanac 1998 The Air Force Facts and Figures*, Air Force Magazine, Vol. 81, no. 5. Arlington Virginia: The Air Force Association, May 1998, 53.
[118] *Air Mobility Command, Command Data Book*, 7.
[119] Fricano, 6.

KC-135 Fleet

The KC-135's primary mission during the Cold War was to aerial refuel Strategic Air Command's armada of nuclear bombers and is still today the backbone of aerial refueling. At the end of the Cold War, a 1991 Strategic Air Command study showed the projected reduction in requirements for aerial refueling. The study acknowledged the reduction in the number of bomber and fighter aircraft due to the projected draw down.[120] However, it did not address the need for aerial refueling for airlifters, nor did it address the increasing requirement for aerial refueling for NATO aircraft because the United States has the only substantial aerial refueling capability. Unfortunately, the 1991 study led to two decisions about the KC-135 fleet. First, the Air Force withdrew 100 tankers from service and sent them to the aircraft bone yard at Davis-Monthan Air Force Base in Arizona. Secondly, the Air Force divided the remaining fleet between the Air Force Reserve and Air Mobility Command. Under this arrangement, the total active inventory fell from 413 aircraft in 1991 to 168 aircraft as of 18 October 1999.[121]

The KC-135 also requires upgrades to meet mandated requirements in the aerospace environment. The avionics replacement program currently underway to achieve this is called PACER CRAG, which performs a number of avionics upgrades to the aircraft. It provides reduced vertical separation minimums that are required for operations over the North Atlantic since March 1997. It also installs avionics to comply with the new Global Air Traffic Management requirements. Thirdly, it installs color radar to detect weather, computerized data loading capability, and embedded Global Positioning Systems, among other avionics. In combination, these upgrades enable the fleet to reduce the number KC-135 navigators, who number 213, which will provide savings to the Air Force through a reduced cost of manning. However, this implies that installation, maintenance and repair costs for the new equipment will be less than the manning costs of a navigator per aircraft for future years. Air Mobility Command's plan is to reduce the number of KC-135 navigators through normal attrition and reducing the number of navigators trained.[122] Installations began in January 1998, and the fleet will be complete by 2002.

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[120] Juliane K. Smith, Lt Col Steve Cheavens, and Maj Michael Zenk, *1991 Tanker Study*, Offutt AFB, Nebraska: Strategic Air Command, 1 March 1991, 4-8.

[121] Department of the Air Force, *United States Air Force Statistical Digest Fiscal Year 1996*, 95; *Air Mobility Command, Command Data Book*, 12.

[122] This is Air Mobility Command's official position on navigator reduction due to PACER CRAIG. Fricano, 66.

An insufficient crew ratio has occurred in every operation from Desert Shield the Allied Force. During Operations Desert Shield and Desert Storm, Central Command required a KC-135 crew ratio of 2.0, but the manning level set at 1.27, coupled with the high number of tankers required in theater and for airbridge support, created an impossible situation.[123] Consequently, Central Command had to settle for a 1.5 crew-ratio in its KC-135s. Concurrently, Strategic Air Command's Single Integrated Operation Plan suffered from a lack of tanker support. This KC-135 crew-ratio problem resulted in an increase in the crews' flying-hour limit from 125 to 150 hours per month creating fatigue among KC-135 crews.[124] The increased number of KC-135 sorties required during Operation Allied Force finally resulted in the re-examination of the KC-135's low crew ratio of 1.27 and the renewed call for a 1.56 crew ratio.[125] During the operation, the joint forces commander, General Wesley Clark, insisted on a KC-135 crew ratio of 1.8, but because of the large numbers of KC-135s involved, additional crews could not be mustered.[126] Even before Operation Allied Force, the Tanker Requirements Study of December 1996 identified shortages in both aircraft and aircrews. Unfortunately, this information was not included in the Defense Planning Guidance for fiscal years 2001 to 2005.[127]

The KC-135 is one of the Air Force's oldest in-service aircraft with an average fleet age of 39 years and has been the backbone of aerial refueling for 45 years.[128] Air Mobility Command projects the phase-out of the KC-135 fleet beginning in 2013 and continuing through 2040.[129]

Air Mobility Command will analyze the MRS BURU 2005 for aerial refueling alternatives that will precede KC-135 retirement.[130]

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[123] Cohen, *Gulf War Air Power Survey, Volume III, Logistics and Support*, 204.
[124] *Ibid*, 204.
[125] Gen Charles T. Robertson, *Keynote Speech to the Airlift/Tanker Association*, Dallas: 6 November 1999.
[126] John A. Tirpak, "Airlift Reality Check." *Air Force Magazine*, December 1999, 36.
[127] *Air Mobility Strategic Plan 2000*, 2.4.2.
[128] The KC-135 fleet and the B-52 fleet together are the two oldest fleets in the Air Force where both have an average fleet age of 39 years old. As of 30 September 1997, Mehuron cites that both fleets are each 36 years old respectively. Consequently, at the time of this publication in the fall of 2000, both fleets are 39 respectively. Mehuron, 53.
[129] Fricano 81.
[130] *Ibid*, 81.

En Route Infrastructure

When Air Mobility Command stood-up in June 1992, the air mobility en route infrastructure included 39 locations with a total of 5,287 manpower authorizations yet, as of 1 November 1999, there were only 12 locations with only 3,933 manpower authorizations.[131] A smaller worldwide en route basing system must support the strategic flow of airlifters transporting passengers and cargo to two theaters of operation. The challenge lies in determining the best means to airlift passengers and cargo to the combatant commanders in each theater. Air Mobility Command must choose which facilities it will re-capitalize, improve, or remove. This decision is subject to airlift fleet composition, Transportation of equipment and passengers, fuel available, aircraft parking available, and delivery schedules.

European Structure

In analyzing the Southwest-Asian theater of operations, Western Europe is strategically located to support operations in this region. Five of the six en route locations fall between 3,500 and 4,000 nautical miles from both the United states and the Arabian peninsula: Mildenhall Royal Air Force base in England; Rhein-Main and Ramstein air bases in Germany; Rota airbase in Spain; and Lajes airbase in Portugal. The sixth location, Incirlik airbase in Turkey, lies near the theater of operations.

The throughput of passengers and cargo depends on five factors at each en route location. The weather factor includes icing conditions and low-visibility in Central Europe and Germany, which slowed the delivery of equipment and forces to Bosnia substantially. Weather in Germany can easily close down operations for some period of time in winter months. A second factor is route vulnerability. An example is the denial of French and Spanish over-flight during Operation Eldorado Canyon in 1986, which presented a significant dilemma to mission planners. Future denial of foreign airspace by Austria, Switzerland, Eastern Block nations, or France can introduce substantial delays to an already difficult scenario. A third factor is political support because Air Mobility Command often contends with constraints such as quiet hours, daylight operation only, holidays, clearance delays, landing rights, and noise abatement in order to comply with foreign regulations. Such anticipated delays add risk to mobility air forces' 24-

[131] *Ibid*, 40-41.

hours-a-day, 7-days a-week operations. A fourth factor is airfield suitability. Most of air mobility operations overseas occur at bases with single runways. The only multi-runway base is Rhein-Main. A closed runway would severely limit air mobility operations. In addition, mobility air forces require bases with high-capacity fuel systems, large ramps, large weight bearing capacities, and wide clearances from obstacles near runways, taxiways, and ramps. The fifth factor is presence, as it is easier to carry out air mobility operations at locations with an active, day-to-day presence. The uncertainty of access rights, fuel amounts, obstacles, ramp availability, and other restrictions increase unless there is daily presence to ensure smooth operations.

Pacific Structure

Air Mobility Command routes most requirements through Alaska, weather conditions permitting, because this route is geographically shorter and only requires one stop to get into theater. Whereas, the mid-pacific route requires fuel stops at both Hickam Air Force Base Hawaii and Andersen Air Force Base Guam. Fortunately, weather along this route is usually better during the winter months, despite strong seasonal headwinds en route to Guam.

Political support comes into play when we reach the Far East due to the need to transit and recover large numbers of airlift and tanker aircraft in Japan. In addition to US military bases, the US is dependent upon the use of civilian infrastructure to process the passengers and cargo. Unlike the European aerospace infrastructure, that has many alternate civil and military fields to increase flexibility, the Pacific is far more limited.

Constrained Throughput

The current enroute infrastructure is unable to support national security objectives for the major theater-war model.[132] Weakness in the en route structure constrains mobility air forces current throughput by approximately 20 to 30 percent.[133] The MRS BURU used the standard maximum time-on-ground to calculate airlift capability that excluded time requirements for required aircraft inspections and proper servicing of aircraft.[134] The use of standard maximum

[132] Matthews, *General Kross, Commander in Chief United States Transportation Command and Commander Air Mobility Command: An Oral history,* 57.
[133] Fricano, 46.
[134] Stucker, James, P. and R. Berg. *Understanding Airfield Capacity for Airlift Operations,* Santa Monica, Calif.: RAND, MR-700-AF/OSD, 1998,

time-on-ground underestimated the average aircraft's time-on-ground consequently, overestimating the accuracy of the TPFDD flow by 12 to 13 percent.[135]

At each of the en route airports in Europe, three factors constrain the en route structure: aircraft servicing, fuel, and ramp space. These three factors, which are available in a limited capacity at the en route infrastructure locations, combine to create an "airlift capacity" shortfall of the requirement set by MRS BURU.[136] The configuration of these three factors at each of the en route airports affects each airlifter differently. For example, ramp space in England and Germany England can better accommodate C-141s than C-5s. Spain has the ramp space to accommodate the C-5 fleet, but cannot meet their fuel requirements. Therefore, the location chosen for the different airlifters to refuel changes the total throughput because the constraining factors vary depending upon both the airport location and the airlifters using it. Consequently, a hierarchy of airlift capacity exists for each fleet depending upon requirements. (see figure 4.2).

Airlift Capacity

	Servicing	Ramp Space & Servicing	Fuel, Ramp Space, & Servicing
C-5 Fleet	Spain	Spain	Germany
C-17 Fleet	Germany	England	Spain
C-141 Fleet	England	Germany	England
KC-10 Fleet	Germany	England	Spain

Source: Stucker, Analyzing the Effects of Airfield Resources on Airlift Capacity.

Figure 4.2

Improper use or less effective use of the en route structure can decrease an already constrained system. Conversely, a best route profile would reduce the constraints inherent in the

[135] Stucker calculated ground times of each of AMC's airlifters by estimating the duration for all the functions that an airlifter processes through during each sortie. He included required inspections and servicing, which the MRS BURU failed to incorporate into its calculations. James P. Stucker, *Analyzing the Effects of Airfield Resources on Air lift Capacity*.Santa Monica, California: RAND, 1999, vi and 10.
[136] *Ibid*, 73-76.

structure and increase throughput.[137] Unfortunately, when employing this best route, throughput stills falls short of the MRS BURU requirement. Although it is possible to increase throughput using a best route profile, airlift capacity is still constrained by the en route infrastructure.

The average 30-day throughput requirement, based on the airlift capability of 43.9 million ton-miles per day, falls short. The enroute infrastructure is a bottleneck because all 12 overseas locations as well as locations within the United States require some type of major repairs and upgrades to their aging facilities.[138] For example fuel storage systems are both in need of repair and require upgrading for greater capacity. To correct en route structure weaknesses, the Defense logistics Agency has earmarked $1.5 billion over the next 20 years for twenty different military construction projects at Air Mobility Command's overseas locations. Air Mobility Command earmarked an additional $127 million and established a nine year plan to improve the living and working conditions of people assigned to these overseas en route locations.[139]

Inability to Achieve Current Requirements

An analysis of million ton-miles per day capacity calculated through UTE rates and cargo classifications identifies how the airlift capability shortfall occurs. This study's analysis of the force structure of Air Mobility Command examined both the airlift fleet and the tanker fleet. This examination revealed C-5 reliability problems, C-141 retirement, and C-17 acquisition as contributing factors to reduced airlift capability. The airlift shortfall occurs in the transportation of both outsize and oversize cargo. In examining KC-135 fleet capabilities, this study identified requirements to increase both the KC-135 aircrew ratio and the number of tankers in order to meet the demands placed on aerial refueling. Next, this study analyzed Air Mobility Command's en route infrastructure and, in doing so, identified the factors involved with throughput constraints and cited the fixes underway to overcome them over the next 20 years.

Combined shortfalls in airlift capability, tanker capabilities, and en route infrastructure capability presents a serious challenge to Air mobility Command achieving its 49.7 million ton-miles per day requirements in accordance with MRS BURU. What this study has so far identified, is a force-structure shortfall in meeting the requirements of a two major-theater wars

[137] Stucker, 63-70.
[138] Matthews, 57.
[139] *1998 Air Mobility Master Plan*, Objective 2b2: Upgrade en route facilities to meet command standards.

model. Next, this study will analyze Air Mobility Command's steady-state operations to determine if a force structure based on two major- theater wars can handle those operations.

CHAPTER 5

NEED FOR A NEW FORCE STRUCTURE

> *The burden placed on U.S. strategic mobility forces will not become less demanding in the future. To the contrary, the potential demands of peacetime engagement, reduced infrastructure at overseas bases needed to support airlift enroute to a crisis, the likelihood of smaller-scale contingencies worldwide, and the increased possibility of confronting nuclear, biological, and chemical threats all pose challenges for mobility forces that were not accounted for in the mobility update.*
>
> *Quadrennial Defense Review, 1997*

Current United States defense strategy calls for military forces to fighting two major theater wars at the same time.[140] The magnitude of equipment and materials needed to fight two major theater wars prompted Transportation Command to assess its requirements for airlift, sealift, and prepositioning, which resulted in the MRS BURU. Air Mobility Command established its force structure requirements based on its portion to airlift military forces in support of the two major theater wars construct.

The force structure of Air Mobility Command currently performs many steady-state operations which include air mobility operations for small-scale contingencies, non-combatant evacuations, peacekeeping, peace enforcement, humanitarian assistance, emergency relief both domestically and internationally, and special airlift operations. [141] The number of steady-state operations has risen significantly since the end of the Cold War. The secretary of defense in his Quadrennial Defense Review says to expect an increase in mobility, yet numbers of both air mobility personnel and airframes continue to decline without authorizations to replace them.

This study examines the current use of mobility air forces by citing the needs set by the Quadrennial Defense Review and then examining the growth of steady-state operations performed by Air Mobility Command. Next, this study examines the various types of small-scale contingency operations, humanitarian and peace operations, and special airlift operations.

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[140] *Ibid.*
[141] National Defense Panel, 25.

Quadrennial Defense Review

In 1997, the military force structure designed to meet the requirements to fight two major theater wars received criticism when the Clinton administration reassessed the nation's military force structure in its Bottom-Up Review. Congress posed three main questions concerning the planned force structure for two regional wars.[142] The first question asks, what are the underlying assumptions of the planning strategy? The second question asks, are military force levels that are recommended to carry out that strategy enough? The third question asks, what is the funding proposed for such recommended force levels?

To answer these questions, Congress passed the National Defense Authorization Act of 1997, in which Congress tried to grasp the force structure requirements when they stipulated:

> "In order to ensure that the force structure of the armed forces is adequate to meet the challenges to the national security interests of the United States in the twenty-first century, to assist the secretary of defense in conducting the review referred to in paragraph (5), and to assess the appropriate force structure of the armed forces through the year 2010 and beyond (if practicable), it is important to provide for the conduct of an independent, nonpartisan review of the force structure that is more comprehensive than prior assessments of the force structure, extends beyond the quadrennial defense review, and explores innovative and forward-thinking ways of meeting such challenges."[143]

This law also authorized the secretary of defense to conduct the first Quadrennial Defense Review, which would include an examination of the military force structure. In compliance with this directive, the secretary of defense produced the QDR, which examined mobility requirements from a viewpoint of several scenarios to include small-scale contingency operations, two major theater wars, and regional conflicts against hostile governments.

To meet mobility objectives, the QDR cited the 1995 MRS BURU, which recommended an airlift capability to transport 49.7 million-ton- miles-per-day. [144] This figure has been the benchmark ever since Air Mobility Command released the MRS BURU. The secretary of defense in his QDR, however, also acknowledged the growing need for mobility assets. He stated:

[142] *National Defense Authorization Act for Fiscal Year 1997*, 104th Cong., 2nd sess., H.R. 3230, Subtitle B--Force Structure Review, Section 922.
[143] *Ibid*, paragraph 7.
[144] Department of Defense, *Mobility Requirements Study Bottom-Up Review Update*, 8.

> "The burdens placed on US strategic mobility forces will not become less demanding in the future. To the contrary, the potential demands of peacetime engagement, reduced infrastructure at overseas bases needed to support airlift en route to a crisis, the likelihood of smaller-scale contingencies worldwide, and the increased possibility of confronting nuclear, biological, and chemical threats all pose challenges for mobility forces that were not accounted for in the mobility update. These and other key issues will be evaluated and will receive increased emphasis as DoD formulates upcoming budget requests for strategic mobility programs." [145]

While mobility requirements rose, air mobility capacity declined during the next five years. By 1997, Air Mobility Command could no longer achieve the 49.7 million-ton-miles-per-day recommended for the two major theater wars.

Steady-State Operations

Since the end of the Cold War and the stand-up of Air Mobility Command, the world political situation has prompted a growth in the need for mobility air forces. In fiscal year 1994, AMC transported 237,000 tons of cargo and 850,000 passengers and participated in 80 JCS exercises as well.[146] Thus, the monthly average of passengers and cargo transported in 1994 approaches the monthly average of those transported during Gulf War and has not significantly decreased since.

This increase in air mobility operations is due to the United States intervening in international political situations before they boil into crisis. The United States has increased its involvement in United Nations missions because the United States is the only country with an air mobility system capable of transporting military troops and equipment around the globe.[147] The United States policy aims to achieve three things. First, the United States seeks to enhance its security by securing its interests worldwide. Secondly, the United States seeks to bolster its economic prosperity by keeping open the markets of nations who trade with the United States. Thirdly, the United States seeks to promote democracy abroad, which includes assisting fledgling democracies.

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[145] *Ibid*, 8.
[146] History, Air Mobility Command, *Air Mobility Command 1995 Historical Highlights*, Scott AFB, Ill: Air Mobility Command History Office, 1996, 1-5.
[147] Hutchenson, 32.

Smaller-Scale Contingency Operations

The number of smaller scale contingencies rose from 11 percent of Air Mobility Command's operations during the 1980s to 32 percent in the 1990s. These may pose different challenges for strategic lift and more airlifters. For example, Transportation Command transports supplies to places that are landlocked, such as Afghanistan, Angola, Belarus, Tajikistan, and Mongolia. In another example, Transportation Command transports military forces directly to their final destination, such as Sarajevo, rather than to a point enroute to their final destination. Furthermore, many regions of the world lack modern airport facilities, long enough runways, or proper unloading equipment. Planning for such situations increases Transportation Command's requirement for C-130s and C-17s due to their maneuverability and ability to land at austere locations. Thus, three questions arise: first, do mobility air forces have enough airlifters to transport cargo for smaller operations? Second, will mobility air forces meet the timelines set by the TPFDD? Third, will the National Command Authorities accept a slower TPFDD, which also means a riskier deployment schedule?

A 1995 analysis by the General Accounting Office concluded that 40 C-17s could deliver cargo to any one of three small-scale contingency operations under a small risk, which included a peacekeeping mission, a humanitarian operation, and a noncombatants evacuation. Unfortunately, this analysis did not evaluate how many C-17s Transportation Command would require to conduct these operations simultaneously.[148]

A notable example is the Balkans Wars of the 1990s. During Operation Joint Endeavor, in Bosnia from 4 December 1995 to January 1996, 1535 airlift sorties transported 10,933 passengers and 20,791 tons of cargo. Before Operation Allied Force in Kosovo began, Air Mobility Command initiated Operation Phoenix Duke I, where 150 tankers deployed to locations in Europe to establish an airbridge. Along with them, Air Mobility Command sent TALCEs to provide the required air mobility support for both the airbridge and the new channel structure. First put in place on 11 October 1998, Air Mobility Command redeployed them in early November because the Yugoslav government agreed to NATO's terms. When the Yugoslav government again sought to dispute NATO demands, President Clinton announced the execution

[148] US Congress, *Moving U.S. Forces: Options for Strategic Mobility*, 54.

of Operation Allied Force. Immediately, Air Mobility Command initiated Operation Phoenix Duke II by again deploying 150 tankers and TALCE teams on 18 February 1999.

Global Attack Operations.

To reduce limitations of time and range, combat aircraft depend on aerial refueling. Bombers in the continental United States prepared to hit targets in a specific theater of operations and launch on non-stop bombing mission from the continental United States. The feasibility of these missions requires air mobility support in the form of both tankers and TALCEs. The TALCEs deploy to the deployed locations of the tankers, which perform the aerial refueling required by the bombers. In addition, these same TALCE provide the bombers with an enroute infrastructure of emergency airfields.

Mobility air forces deploy fighters to locations in theater. Tankers move the fighters from the continental United States to the theater of operations, where the fighters arrive ready to perform their missions. While working in the theater, fighters also rely on tankers to sustain them with fuel while airborne, so they can continually engage any airborne adversary without flying back at their base of operations to refuel and rearm their aircraft.

Sustaining combat air forces once deployed in theater with materials and equipment requires aerial lines of communication. Strategic airlifters require aerial refueling because they transit from the continental United States to operations in different theaters around the globe. Strategic airlifters using channels transport cargo to aerial ports where air mobility support units transfer the cargo from the strategic air lifters to tactical airlifters. The tactical airlifters in turn, transport the cargo to combat forces at their concentration points. Requirements for aerial refueling will increase with the Air Force's objective for achieving agile logistic support and the focused logistics concept identified in Joint Vision 2010. Agile means flexible, which requires airpower. For the United States, aerial lines of communication are the means by which she supports her operations in theaters around the world because they provide the avenue for rapid global response.

Deterrence Operations.

The US often seeks to deter other states from taking action against US interests. The threat of increasing a government's civilian costs will deter that government from exerting its political will through military aggression.[149] With increasing civilian costs in mind, if the United States wants to prevent a country from exerting its political will through military means, the United States could build-up military forces in a neighboring country. The potentially aggressive country would interpret the buildup as threat to its people if it acted militarily to exert its political will. Thus, this perceived threat raises the cost to that country if it decides to exert its political will through military force.

This argument requires a tremendous amount of airlift to deploy the coercive airpower assets into theater rapidly. Airlift is the prime mode of transportation because coercive airpower assets can only move into theater by employing air mobility assets. Fighter aircraft deploy by employing tankers for coronet support, and their maintenance support must deploy by air because those fighters will require maintenance for reconstitution after the initial deployment flight. Reconstitution is also required if the fighter aircraft are going to fly combat patrol sorties once they arrive in theater as espoused in air force doctrine.[150]

Prepositioning of these assets is moot because advanced notice is required to build a TPFDD, which would determine both the deployment schedule and the preposition structure. Furthermore, the United States does not possess enough assets to do both. The US cannot preposition coercive airpower assets at every possible crisis spot in the world. However, the US also employs coercive airpower assets in the numerous operations underway at any given time around the world. Unfortunately, US forces cannot employ prepositioned assets for operations currently in progress.

Supporting the deterrence argument are no-fly zone operations. Upon the termination of the humanitarian operation, Provide Comfort, which preceded Operation Northern Watch, the Turkish government approved continuing the air operation from Incirlik Turkey as the new military operation, Northern Watch, which began on 1 January 1997.[151] A Joint Task Force charged with conducting air operations over Northern Iraq, Operation Northern Watch enforces the No-Fly Zone established by United Nations Security Council Resolutions 678, 687 and 688, which has no termination date and which continues today. A combined joint task force, operation Northern Watch employs forces from the United States, the United Kingdom, and

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[149] Schelling refers to this as the creation of risk, which is brinkmanship. Thomas C. Schelling, *Arms and Influence.* New Haven, Connecticut: Yale University Press, 1966, 91.
[150] Air Force Doctrine Document 2-6.2, 18.

Turkey, where the combined forces total approximately 45 aircraft and 1,100 personnel. The joint forces from the United States include Air Force, Army, Navy, and Marines. The joint forces from the United Kingdom include Royal Air Force and Royal Army. The joint Turkish force includes Army, Navy and Air Force.

Operation Southern Watch also sought to deter Iraqi aggression. The atrocities performed by Iraqi military forces against Shiite Muslims in southern Iraq prompted an action similar to Operation Northern Watch. So, beginning on 18 August 1992, Operation Southern Watch also continues today with an unspecified termination date. In support of this operation, Air Mobility Command deploys, sustains, and redeploys United States military forces to and from Saudi Arabia to enforce the ban on Iraqi flights below the 32d parallel.[152] This no-fly-zone operation also requires deployed tankers to refuel the allied combat air patrols performing the military occupation of Iraqi airspace.

Non-combatant Evacuation Operations

Operation Assured Response, the evacuation of non-combatant Americans from Liberia in April of 1996, provides an example of air mobility removed hundreds of non-combatants from the threat of war. During Assured Response 94 sorties evacuated 2,153 passengers and 2,148 tons of cargo.[153]

Airdrop Operations

To seize some airfields, the Army would to deploy brigade-size forces anywhere in the world within a short time frame. To accomplish that Transportation Command would airdrop a ground force of 2,500 troops with their equipment from the United States or from a staging area in either Europe or the Pacific Rim. After the initial airdrop, airlifters would deliver additional equipment to reinforce those units. Transportation Command conducted large airdrops into Grenada in 1983 and Panama in 1989, and it was prepared to conduct one into Haiti in 1994.

Once the C-141 fleet retires, Transportation Command will need at least 100 C-17s to conduct a large airdrop at a moderate level of risk. With a smaller number of C-17s, the United

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[151] Ssgt John, DeShetler, CTF Historian. *History of Operation Northern Watch,* Incirlik, Turkey: CTF, September 1999, 1.
[152] History, Air Mobility Command, *Air Mobility Command 1992 Historical Highlights,*1-5.
[153] *Air Mobility Strategic Plan 2000,* 2-25.

States could not insert its forces as rapidly, creating a higher risk. A fleet with 120 C-17s could transport the brigade-size force within the necessary timelines with low to moderate risk.

Direct Delivery Operations

The Army would like Transportation Command to transport cargo directly from the United States to sites near the battlefield. The C-17 can perform this mission but, as discussed in chapter three, will be restricted depending on the terrain. However, if some C-17s conduct airdrop missions how many will be available to perform airlift in accordance with the TPFDD. In other words, the pace of deployments from the United States would slow-down significantly.

Intratheater Transport Missions

Rather than devoting all C-17s to strategic airlift, regional commanders in chief may want to devote one or two squadrons for intratheater airlift. If Transportation Command assigns some C-17s for intratheater airlift, they would experience a shortfall in strategic airlift. Again, as with direct deliveries, the pace of deployments from the United States would slow-down significantly. Transportation Command would consequently need to buy more airlifters to make up for the shortfall in strategic airlift for outsized and oversized cargo. The CRAF could add strategic airlift capability for transporting passengers and bulk cargo. Conversely, with fewer strategic airlifters Transportation Command would rely on trains and trucks to transport outsize cargo intratheater, which would be far slower than by air.

Humanitarian and Peace Operations

Humanitarian operations and peace operations are on the rise. The United States spent just over two billion dollars in 1990 on humanitarian and peace operations, whereas in 1995 those operations cost over nine billion dollars.[154] Mobility air forces participated in 167 humanitarian operations assisting 74 countries from 1990 to 1996, which comprised 12 percent of United States military operations.[155] A quick examination of several humanitarian operations shows the varied capabilities of mobility air forces required to perform them. These operations often task air mobility assets to the limits of their current force structure, as an examination of several operations will demonstrate.

[154] Hutcheson. 83.
[155] *Ibid.*

Long-term humanitarian operations require air mobility to establish TALCEs on the newly created channels, whereas smaller operations rely on the TALCEs on existing channels. The TACC deployed TALCEs to support numerous air mobility unusual operations. A few examples demonstrate the need for air mobility support. During Operation Provide Transition, from 12 August 1992 to 7 October 1992, with Angolan elections pending, US airlifters transported demobilized Angolan soldiers to their homes following negotiations to end the 16-year- old civil war. Air Mobility Command, through 326 sorties, transported 8,805 passengers and 295 tons of cargo. During Operation Provide Relief, from 21 August 1992 to 28 February 1993, Air Mobility Command deployed to Mombasa, Kenya, to transport food to the drought-ridden population of Somalia, where over 3,100 sorties delivered 34,400 tons of cargo. During Operation Impressive Lift, from 13 September to 29 September, Air Mobility Command transported United Nations peacekeeping forces from Pakistan to Somalia. Ninety-four sorties delivered 74 passengers and 1,168 tons of cargo.

Humanitarian operations began following the Gulf War when Iraq experienced several popular uprisings erupted in Iraq. Many nations hoped that any one of these might be successful. Unfortunately, Saddam Hussein promptly moved his remaining military forces to crush the uprisings, which occurred in the Shiite-south and the Kurdish-north. During the war President Bush called upon the people of Iraq to remove Saddam Hussein from power, but probably did not expect to provide military support to prevent Saddam Hussein from killing masses of his own people.[156] Unfortunately, both the Kurds and the Shiites succumbed to the genocidal wrath of Saddam Hussein, and the United States felt obliged to prevent these killings, so a month after Desert Storm ended Operation Provide Comfort began. From April 1991until 31 December 1996, Operation Provide Comfort required 33,381 sorties to transport 29,555 passengers and 118,340 tons of cargo.

Humanitarian operations began following the involvement of non-governmental agencies in Somalia where civil war and disease killed many Somalis. To alleviate Somali suffering numerous relief organizations began to provide food and clean water. However, the tumultuous effort included international agencies that worked in an uncoordinated fashion and with insufficient equipment to deliver food across Somalia. The United States, without much notice, decided to help by initiating Operation Restore Hope. Therefore, from 9 December 1992 to 10

[156] Michael Sullivan, *The Gulf War*, Frontline: WGBH Educational Foundation, 1996, two videocassettes.

May 1993, Air Mobility Command flew 1,182 sorties in Operation Restore Hope to transport 51,431 passengers from 22 allied nations and 41,243 short tons of cargo. The United Nations sanctioned this military intervention into Somalia in order to safeguard the delivery of food to the starving Somali population. Furthermore, tankers flew 1,170 sorties that transferred 82 million pounds of fuel. On 13 January 1993, a commercial air carrier redeployed 244 marines.

During Operation Restore Hope, as in many humanitarian operations, TALCEs were critical because Somalia had virtually no trained airport personnel capable of handling the huge amount of air traffic. The airfields inside Somalia had deteriorated from the years of disrepair and war. The first TALCE in Somalia set up at the Mogadishu airport and controlled all intra-theater airlift operations. It performed surveys to examine the extent of damage, and they coordinated with Navy Seabees to scrape the thick foliage from the airfield's runways, taxiways, and aircraft parking aprons.[157] In addition, TALCE personnel billeted themselves in an abandoned hangar until portable shelters arrived. As operations increased, the Mogadishu TALCE detached personnel to establish another TALCE at Kismayuto and then at Barderea and again until the total number of TALCEs in Somalia reached seven.[158]

<u>Peacekeeping.</u> In 1994, US forces changed their plans from an invasion of Haiti to a peace operation. The United States decided to install the elected president by force if the ruling junta failed to step aside peacefully. The deadline passed and, with the time running out, US forces massed to invade Haiti. However, the US envoys Colin Powell and former President Jimmy Carter negotiated the general's compliance. Mobility and combat aircraft were airborne and on their way to commence Operation Restore Democracy, although the US envoys had not yet left Haiti. The execution hour came and went while the military aircraft remained airborne awaiting orders. The envoys emerged with the junta leaders in agreement to restore President Aristide to Haiti. The operation was instantly renamed Uphold Democracy and military forces entered Haiti unopposed. Aircraft in Haiti, from September 1994 to April 1995, conducted 2,651 airlift sorties, transporting 24,152 passengers and 22,274 tons of cargo.

<u>Peace Enforcement.</u> When ordered by the national command authorities, Transportation Command deploys military forces to enforce a peace between factions, such as in the current

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[157] John L. Cirafici, *Airhead Operations, where AMC Delivers, The Linchpin of Rapid Force Projection,*Maxwell AFB, AL: Air University Press, March 1995, 41.

operations in Kosovo. Peace enforcement operations adhere to more rigid schedules than a peacekeeping deployment, and usually involve a much greater number of military forces with their heavy equipment. Thus, peace enforcement operations place greater demands on mobility air forces than do peacekeeping operations.

Emergency Relief. The national command authorities call on Air Mobility Command to airlift supplies and passengers for relief of natural disaster victims worldwide both inside and outside of the continental United States. Domestically, Air Mobility Command led relief efforts during the July 1998 Everglade fires in Florida, providing 740 tons of fire-fighting equipment from the northwestern United States. The oversized fire-fighting equipment required the use of C-5s and C-141s. Internationally, Air Mobility Command is the lead organization to respond to emergencies. For example, in August 1998, following the American embassy bombings, mobility air forces flew over 100 sorties to evacuate embassy employees, wounded and deceased. Mobility air forces also provided transportation to the State Department, the Federal Emergency Management Agency, and other governmental agencies.[159] These emergencies overlap the timelines and requirements of other operations while daily routine sorties must continue, thus taxing the Air mobility system to its limit.

Helping Former Adversaries. The creation of the Commonwealth of Independent States gave the US a perfect opportunity to assist these new governments with the hope they would become democratic nations. During Operation Provide Hope, from 14 June 1992 to May 1993, Air Mobility Command operated 109 sorties, including 25 by commercial aircraft, to transport 2,438 tons of cargo. By 17 June 1997 Air Mobility Command had flown over 500 missions to the states of the former Soviet Union.

Requirements Imposed on Mobility Air Forces

The above operations exemplify the varied requirements placed on air mobility forces. The number of missions and sorties per year required to transport passengers and cargo has exceeded the capabilities of Air Mobility Command's fleet of military aircraft.[160]

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[158] *Ibid*, 54.
[159] Hutcheson, 93-97.
[160] Alan Vick, David T. Orletsky, Abram N. Shulsky, and John Stillion, *Preparing the U.S. Air Force for Military Operations Other than War,* Santa Monica, California: RAND, 1997, 141-160.

What is common about all these different operations is that they all required unplanned air mobility support. Most required execution before the theater commander and Transportation Command could build a TPFFD. With such last minute requirements for movement, the default means of transportation is by airlift. For some other operations, the theater commanders validated TPFDDs to move military forces in place for their operation. However, once the national command authorities executed the theater commander's plan, either the military circumstances changed or the political objective changed. Thus, the TPFDD requirements changed because the theater command needed military forces in theater sooner than the TPFFD scheduled them. Airlift provides the quickest means to move forces into theater. Small scale contingency operations and humanitarian operations have become Air Mobility Command's steady state operations.

The national command authorities seek action at the most appropriate time, often immediately when a situation arises which requires rapid global mobility. The rapid global response capability of airpower puts Air Mobility Command at the threshold of every operation. Unfortunately, world situations can occur simultaneously and so does Air Mobility's response, which causes operations to occur cumulatively. In other words, one operation overlaps another operation. Thus, the cumulative affect of these steady-state operations tasks mobility air forces beyond their daily limit.

Strategic Airlift

In 1997, General Walter Kross, then commander in chief of Transportation Command, addressed the requirements for an airlift force structure. He said, "We need about 260 T-tails to do our global work every day for training, maintenance, depot, testing, and our daily worldwide missions."[161] In referring to T-tails General Kross means strategic airlifters in Air Mobility Command's authorized aircraft inventory, which include the C-141, the C-17, and the C-5. As of 18 October 1999, Air Mobility Command possesses only 180 T-tails to perform Air Mobility Command's steady-state operations.[162] Consequently, Air Mobility Command is 60 T-tails short of its requirements to perform strategic airlift effectively in support of its steady-state operations.

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[161] Gen Walter Kross, Keynote Speech at the 1997Airlift/Tanker Association convention, Anaheim California: 25 October 1997.

[162] *Air Mobility Command, Command Data Book*, 12.

Aerial Refueling

In 2000, the KC-135 crew force will deploy to support steady-state operations. These operations include task forces at Gielenkirchen and Iceland, business efforts, mission employments, flags exercises, JCS exercises, coronets as well as operations Joint Forge, Northern Watch, and Southern Watch, which require 18,880 temporary-duty days from the KC-135 crew force.[163] However, this misleads analysts because it excludes time in transit and the overlap time required to swap-out crews.[164] Dividing the total temporary-duty days required by an active-duty crew for of 231 crews averages out to 81.73, and when guard and reserve crews are calculated in, the average drops to 51.45 days per crew.[165] This figure too misleads analysts for four reasons.[166] First, the 51.45-day TDY rate includes authorized staff personnel at the squadron, wing, and headquarters levels who cannot deploy because of their required staff duties. Second, the 51.45-day TDY rate assumes that the guard and reserve assume an equal share of the deployments based on the total number of guard and reserve crews. Unfortunately, guard and reserve crews are only part time and can only assume a fraction of the tanker deployments. Furthermore, these steady-state operations exclude unplanned contingencies that could involve the entire 231-crew active-duty tanker force. For example, Operation Allied Force involved 238 KC-135 crews during the 78 days of global attack.[167] Fortunately, the president activated the KC-135 guard and reserve units to augment the active duty. However, during Operation Allied Force, the tanker force left many steady-state requirements unfulfilled due to insufficient assets.

Expeditionary En Route Structures

When mobility air forces operate at deployed locations with a limited infrastructure, they require an expeditionary en route support system. Air Mobility Command's global reach laydown concept provides the flexibility to establish these en route stations around the globe. Under global reach laydown, or GRL, resources from various CONUS based organizations are

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[163] Business efforts are temporary duty assignments where tankers and their crews deploy at numerous overseas locations, worldwide, to conduct aerial refueling training operations for US and allies aircraft. *Ibid*, 9.

[164] Tanker temporary duty rates for crews well below the Air Force goal of 120 days. David Thaler and Daniel Norton, *Air Force Operations Overseas and in Peacetime, Optempo and the Force Structure Implications*, Project Air Force documented briefing, Santa Monica, Calif.: RAND, 1998, vi.

[165] *Air Mobility Command, Command Data Book*, 9.

[166] Thaler and Norton, vi.

[167] Lt Gen William J. Bergert, "Kosovo and Theater Air Mobility," *Aerospace Power Journal*, Vol. 13, no. 4., Maxwell AFB, Alabama: Air University Press, Winter 1999, 11-12.

brought together to form the required expeditionary units to achieve the objectives of any air mobility operations.[168] The GRL concept allows Air Mobility Command to siphon-off assets from permanent mobility air force units to create deployable en route force structure units. The tanker airlift control center, commonly referred to as the TACC, maintains operational control of this deployable force structure.

GRL provides deployable forces to augment fixed enroute locations and establish enroute locations where none existed before. These air mobility support units, stationed both in the continental United States and at overseas locations, expand and contract according to the requirements for support.

Different sizes and configurations meet the flexible demands of expeditionary en route support. First, a tanker/airlift control element, commonly called TALCE is a mobile unit, organized to provide on-site management of mobility airfield operations. Commanded by a commissioned officer, a TALCE is a temporary unit composed of various mission support elements that deploys to provide mission support when theater command and control, mission reporting, or required mission support functions are insufficient.[169] In addition, TALCEs provide aerial port, logistics, maintenance, security, weather, medical, and intelligence services for aircraft when needed.

The second type of unit is a mission support team or MST, which is smaller than a TALCE, but provides the similar support on a smaller scale.[170] Commanded by a noncommissioned officer, mission support teams provide lower level of command and control, aerial port, and maintenance services for one aircraft. The third unit is a mission support element or MSE, which is a unit of specific personnel and equipment that support specific airfield operations. For example, an intelligence shop or weather shop could be a mission support element. These units may be an element of a TALCE, a mission support team, or stand alone unit.

The TACC tailors the size and configuration of each GRL unit by selecting the appropriate personnel and equipment to form deployable TALCEs, MSTs, or MSEs for each

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[168] *1998, Air Mobility Master Plan*, 4-28.
[169] Air Force Doctrine Document 2-6, 60.
[170] *Ibid*, 60

required location.[171] Each GRL unit will fit the specific contingency concept of operations and will begin functioning at it deployed location in 3-5 days with follow-on sustainment after 30 days.[172]

One air mobility support squadron under each air mobility support group contains an air mobility control flight capable of providing an immediate initial response TALCE, MST, or MSE. These units provide the core functions of air mobility support: command and control, aerial port operations, and aircraft maintenance. They also provide additional support capabilities, such as weather or intelligence operations, as necessary. air mobility operations groups, airlift control squadrons, and airlift control flights from the Air National Guard and Air Force Reserve provide the assets to deploy for these operations. Thus, the permanent air mobility force structure provides the personnel, equipment, training, and procedures for deployed operations. It is from these units, collectively referred to as air mobility control units, that command and control, aircraft maintenance, and aerial port personnel deploy to conduct air mobility support operations. Additional personnel and equipment required to deploy for any additional support capabilities, beyond these core functions comes from out of hide. That is air mobility wings, air mobility command headquarters, and anywhere that the Air Force personnel center can steal an asset.[173] Thus, when the personnel center takes a body from an organization, that organization must meet its own requirements with fewer personnel. The deployed structure of air-mobility support units is consequently ad hoc.

The TACC provides GRL units to several simultaneous contingency operations worldwide. Air Mobility Command must ensure that it has enough assets to deploy and meet these GRL requirements. Consequently, the force structure should include requirements to perform the contingency duties.

Dedicated Training Sorties

As noted, maintaining aerial lines of communications in hostile environments requires special tactics and procedures. In order for these tactics and procedures to work, aircrews must train and practice. Unfortunately, crews cannot practice many of these tactics and procedures

[171]Col John Brower, Air Mobility Command Chair to Air University, Maxwell AFB, Ala., interview conducted by author, 22 January 2000.
[172] *1998, Air Mobility Master Plan*, 4-22
[173] Air Force Doctrine Document 2-6, 62.

during routine airlift sorties for several reasons. First, classified equipment may be required. If a crew is going to remain over night at an overseas location, as is the case nearly always, the crew cannot secure the classified equipment. Secondly, many of these combat procedures do not correspond to normal flight rules and regulation and, therefore, are restricted to special-use areas. Thirdly, other procedures require a dedicated airfield because, in order for the airlifter to practice its special training, the airlifter requires the airfield to perform certain special non-standard procedures incongruent with normal airfield operations. These three broad areas explain the need for dedicated training sorties. Unfortunately, air mobility assets would have to reduce the number of the operational sorties they perform in order to conduct the some of specialized training sorties they need to perform efficiently during operations in hostile environments.

Air mobility assets require special sorties dedicated solely for training in order to become proficient at maintaining aerial lines of communications when operating in a hostile environment. A lack of proficiency in combat tactics and procedures can result in an aircrew losing their lives along with the aircraft they fly. Unfortunately, mobility air forces are unable to proficiently achieve these training requirements due to the high operations tempo set by the above mentioned steady-state operations.

CHAPTER 6

Technological Innovation Requirements

At this moment in history, the United States is called upon to lead—to organize the forces of freedom and progress; to channel the unruly energies of the global economy into positive avenues; and to advance our prosperity, reinforce our democratic ideals and values, and enhance our security.

President William J. Clinton

A relationship exists between technological innovation and the national security strategy that affects the nation's military air mobility strategy. Influences on air mobility strategy include the international security environment where threats to United States interests affect the national security strategy. This, in turn, directs the defense transportation strategy and, subsequently, air mobility strategy. The Department of Defense, in building a better defense transportation strategy and operational vision, needs to provide the resources for technological innovations applicable to air mobility forces in order to achieve the vision set forth in the National Security Strategy.

An examination of the National Security Strategy identifies the requirements for air mobility. An examination of the United State's policy of intervention to achieve the National Security Strategy reveals the requirements uniquely suited to air mobility. The US intervention policy effects the Air Mobility Command issues of operations tempo, personnel tempo, doctrine, and air mobility organizations. Existing technological innovations could improve these issues, and the initiation of new technological innovation could further improve air mobility operations.

Air Mobility: Key to National Security

World politics reflects the international strategic environment, which in turn influences our nation's security strategy. The Department of Defense uses several guideline documents or tools to prepare and execute our nation's security strategy. Those tools include: *A National Security Strategy for a New Century*, published by the White House, the Quadrennial Defense Review, published by the Secretary of Defense, the corresponding National Defense Panel Review, and Joint Vision 2010.

The National Security Strategy addresses the need for air mobility in its first core objective: enhancing United States security. The strategy for enhancing our security abroad is threefold: shape the international environment, respond to crises, and prepare for an uncertain future.[174] The Quadrennial Defense Review reiterates this "shape, respond, and prepare," trio-strategy as does the National Military Strategy. Air mobility is an essential element in all three strategies.

In shaping the international environment, the United States must possess a credible military force where military activities include overseas presence and peacetime engagement and the will to use military force.[175] According to the National Defense Panel, overseas presence is the key to a stable international environment.[176] Peacetime engagement includes rotational deployments that help sustain regional stability by deterring aggression and exercises with foreign nations that solidify relations with those nations.[177] Deployments and exercises both require air mobility in the form of both airlift and air refueling in order to transport the necessary troops and equipment. Peacetime engagement also includes other programs such as the Nunn-Lugar Cooperative Threat Reduction Program where the United States assists members of the Commonwealth of Independent States in dismantling and storing weapons of mass destruction.[178] Here, air mobility is the lead component by transporting nuclear weapons to the United States from compliant nations.

Airlift also plays a crucial role in responding to threats and crises by enhancing our war-fighting capability.[179] The United States may move some forces nearer to a theater in crisis and rapidly deploy other forces into that theater. Depending on the crisis, forces from the Army, Navy, Air Force, Marine, or any combination of military personnel and equipment could comprise the force structure required. Consequently, the United States must airlift these forces along with the needed logistics support. In addition, the focused logistics concept of Joint Vision 2010 requires the transportation of supplies and materials to support these forces within hours or days rather than weeks, a mission solely suited to air mobility.

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[174] The White House, *A National Security Strategy for a New Century,* Washington, D.C.: GPO, October 1998, 6.
[175] *Ibid*, 8-12.
[176] National Defense Panel, ii.
[177] Chief of Staff, Air Force, *A 21st Century Air Force*. Washington, D.C.: DFI International, 1997., 3.
[178] The White House, 11.
[179] *Ibid*, 15.

In responding to crises, forces may deploy in support of smaller-scale contingencies which include humanitarian assistance, peace operations, enforcing no-fly zones, evacuating United States citizens, reinforcing key allies, limited strikes, and interventions.[180] Today, United States forces find themselves globally engaged in responding to these contingencies more frequently and maintain longer-term commitments to support these contingencies. In these situations, many deployments occur in the absence of forward basing.[181] The loss of forward basing has reduced Air Mobility Command's worldwide infrastructure from 39 locations in 1992 to 12 in 1999.[182] Thus, the United States must again use air mobility to deploy forces overseas in a minimum amount of time for an operation to be successful.

Policy Affects Air Force Issues

A policy of intervention has wide-ranging affects on Air Force issues that Air Mobility Command exemplifies. First of all, the number of military interventions is on the rise. Secondly, this increase of military interventions has resulted in increased operations for an Air Force and Air Mobility Command that has reduced its force structure. Thirdly, doctrine has not kept pace with Air Force and Air Mobility Command requirements that make adequate use of Air Mobility Command's flexibility for rapid global mobility. The consequence of this lagging behind is that a reduced force structure attempts to meet the growing requirements of an increased number of military interventions.

The requirement for air mobility will increase during this century for three reasons. First, the pace of interventions and consequent use of air mobility forces increased during the 1990s, and that pace is likely to remain high due to the large number of crises.[183] The limits of intervention imposed on us in a bilateral world, where the Soviet Union objected to many of our intended interventions, collapsed with the Soviet Union. Secondly, the end of the Cold War caused the rise of numerous ethnic groups and factions desiring authoritarian and ethnically pure states. In this century, enemies will be more varied and unpredictable. This makes a policy of prepositioning military equipment less effective. Currently, in order to deal with several possible enemies, the US currently prepositions equipment among several potential theaters. Thus, our

[180] *Ibid*, 21.
[181] National Defense Panel, 33.
[182] Fricano, 42.

military equipment is spread thinly. Thirdly, there are a limited number of forward bases available to United States military forces.[184] These factors require a change in our intervention strategy in future contingencies, and the most obvious solution is a need for greater air mobility capability.[185] To handle this increase, a capable air mobility strategy is crucial.

In addressing Air Force issues such as operations tempo, personnel tempo, and retention, as well as doctrine and organization; a capable air mobility strategy is also crucial. In compliance with the Quadrennial Defense Review, Air Mobility Command bases its force structure on the requirement to prepare for two major theater wars.[186] Yet, it currently stretches its force structure to execute an increasing number of smaller-scale contingencies that support the National Security Strategy. This stretched force structure, working at an extremely high operations tempo, has created a dangerously high personnel tempo. Thus, the officers and enlisted personnel of Air Mobility Command, whose duties require flexibility, accuracy, and commitment, perform their duties with inadequate personnel. In addition to the increased number of smaller-scale contingencies, the number of potential-crises points worldwide has doubled since the Gulf War to approximately seventy.[187] Further defining this dangerously high personnel tempo, the secretary of defense stated, " The United States intends to remain a political and military world leader."[188] These new requirements have imposed upon Air Mobility Command a steady state of operations that requires unprecedented employment of its force structure.

A corollary issue is that the force structure has declined by nearly fifty percent while the number of peacetime commitments has increased.[189] Operational personnel work longer hours and experience much longer temporary duty assignments, many far-beyond the 180-day average, to achieve the high operations tempo. In order to perform at this high operations tempo, Air Mobility Command needs to reduce its personnel tempo by leveraging technology.

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[183] *Ibid*, 21.
[184] Secretary of Defense, report of *Quadrenniel Defense Review*, 6-7.
[185] Shalikashvili, 14-15.
[186] National Defense Panel, 21-24.
[187] US Senate Armed Services Committee. *Prepared Statement of General Robert Rutherford, Commander in Chief, USTRANSCOM.* 23 Feb 95.
[188] Linda D. Kozaryn, *America Won't Shrink from Global Role, Cohen Says*, London: American Forces Press Service, 18 November 1999, 1.
[189] Chief of Staff, Air Force, *21st Century Air Force*, 5.

This high personnel tempo is a primary cause of low retention rates among operational personnel as exemplified in the pilot retention rate. Shortly after Air Mobility Command's steady-state operations rose, their pilot retention rates declined. During the 1990s, air mobility forces experienced an escalation of all types of smaller-scale contingencies by thirty-two percent.[190] The percentage of pilots accepting the pilot bonus reflect an alarming downward trend: sixty-six percent of the command's pilots accepted the pilot-bonus in 1995; forty-nine percent in 1996; twenty-four percent in 1997; and nineteen percent in 1998.[191] To increase pilot retention, the Air Force increased the pilot bonus from $12,000 to $22,000 in 1997, yet pilot retention continued to decline the following year.[192] Air Mobility Command needs to research the reasons that its pilot retention is so low and needs to its pilots to determine if the decreasing pilot retention trend results from the extremely high personnel tempo as suggested by many pilots.[193]

A policy of intervention also affects doctrine and organizations within Air Mobility Command.[194] The National Security Strategy relies on a strong military capability to deter conflicts before they arise in order to stop the escalation of confrontations or to de-escalate military conflicts worldwide. In most instances, the national command authorities call upon air mobility to deploy forces, deliver supplies, and retrieve weapons to achieve the required de-escalation. They do so because air mobility forces possess the unique capability to accomplish the lift requirements quickly, within hours when necessary. This capability of rapid global mobility empowers air mobility forces with the flexibility to change requirements as the crisis at hand changes. For example, The tanker airlift control center at Air Mobility Command headquarters often tasks aircraft, while already airborne in the performance their mission, with a new destination or follow-on mission.

Joint doctrine does not deal extensively with air mobility's flexibility. For example, joint doctrine still requires four phases to deploy: pre-deployment activities; movement to and activities at port of embarkation; movement to port of debarkation; joint reception, staging,

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[190] Chief of Staff, Air Force, *Merits of Air Mobility, Enduring Value to the Nation and the World,* Vienna, VA: Point One, Inc., 1999, *41*.
[191] HQ AMC/DPXPA
[192] Fricano.
[193] Casual conversations with scores of air mobility pilots over the last 7 years revealed a common belief among them that the high personnel tempo is driving Air mobility pilots out of the Air Force.

onward movement, and integration activities.[195] However, all too often a contingency deployment does not follow the pre-planned time-phased force and deployment data, whose purpose is to execute the deployment, because of last minute strategy changes imposed by the national command authorities. In numerous instances, smaller-scale contingencies require a different configuration of military forces than previously planned. Operation Allied Force exemplifies this situation because of its unique requirement to exclude ground forces at the last minute. Therefore, air mobility doctrine must reflect a unique flexibility to tailor, at the last moment, the deployment schedules of specific operations. Thus, air mobility is a critical tool of flexibility that the national command authorities often rely on.

The United State's policy of intervention also highlights the need for organizational changes within air mobility units. For example, the increased number of KC-135 sorties required during Operation Allied Force resulted in the re-examination of the KC-135's low crew ratio of 1.27 and the renewed call for a 1.56 crew ratio.[196] During the operation, the joint force commander, Gen Wesley Clark, insisted on a KC-135 crew ratio of 1.8, but because of the large numbers of KC-135s involved additional crews could not be mustered.[197] Other organizational changes resulting from Operation Allied Force occurred when the director of mobility forces created a special duty assignment, director of tanker forces, in the combined air operations center at Vincenza Italy.[198] However, both of these issues have reoccurred in nearly every operation during the 1990s and as such should be included into joint doctrine.[199] Currently, the Air Force Doctrine Center is researching these issues for incorporation into air mobility doctrine.[200]

An additional implication of a policy of intervention is the limited number of air mobility assets to transport the required equipment to a major theater war, should one occur. With the call-up of both the Air National Guard and Air Reserve tanker and airlift forces for Operation Allied Force, the availability of the required air mobility support for a nearly simultaneous major

[194] Miller, 474.
[195] Joint Publication 3-35, III-1.
[196] Robertson, *Keynote Speech to the Airlift/Tanker Association.*
[197] Tirpak, 36.
[198] *Ibid.*
[199] *Ibid.*
[200] Interview with the Director of Air Mobility Doctrine, Major Gary Potter, (Air Force Doctrine Center, Maxwell AFB, AL) 5 November 1999.

theater war would have been unattainable.[201] In addition, Air Mobility Command experiences a shortfall on a daily basis in its requirement to transport outsized and oversized cargo, which only C-5s or C-17s are capable of performing.[202] To address these issues, the United States must leverage technology if it desires rapid global mobility to support the nation's military interventions and a capability to transition to a major theater war.

The increased number of military interventions coupled with the decrease in force structure, create many challenges for the Air Force. To meet the challenges the Air Force should first, research the affects of increased intervention upon its force structure. Next, the Air Force should update its doctrine to fully use the flexible capabilities of Air Mobility Command versus the wasteful concept of prepositioning material that leaves another theater of operations needing more equipment. Thirdly, the Air Force should build an Air Mobility Command that can meet the needs of rapid global mobility, which transports required military equipment immediately, when needed, to the theater of operations, where needed. The most efficient means to achieve these seemingly simple, yet previously insurmountable, tasks is by exploiting military technological innovations.

Many technologies are applicable to mobility air forces. One such application would employ existing technology to build a strategic airlifter with intercontinental range that can fly non-stop without aerial refueling. This would eliminate strategic airlift reliance on the already overburdened tanker force and curtail the requirements imposed on the overburdened air-mobility enroute infrastructure. A second application of existing technologies would be to replace the half-century old KC-135 with an aircraft that would double the KC-135's fuel offload capability and transport outsized and oversized cargo within the confines of a KC-135 footprint.[203] Thus, increasing the tanker's dual role capability and, again, curtailing the reliance on the mobility enroute infrastructure.

[201] Tirpak, 32.
[202] Fricano, 68.
[203] Footprint refers to the physical size of an aircraft both in wingspan and fuselage length, as wells as the pounds per square inch of the landing gear.

Military Technological Innovations

The United States policy of intervention requires that it prepare against a wide range of threats by using various combinations of technology at different levels of intensity.[204] For instance, the need for rapid global mobility requires better communication and coordination in order to improve command and control of the various operations required. To meet this challenge, Air Mobility Command has implemented a couple of programs. First, in order to coordinate access to increasingly congested airways worldwide, the command must upgrade its aircraft with automatic dependence surveillance.[205] This surveillance system, already prevalent in the commercial airline industry, automatically reports an aircraft's location, heading, and speed through satellite to the receiving air traffic control center, which enables aircraft to fly closer together. Non-compliant aircraft are restricted from prime routes, creating longer missions that consume more fuel. In response to this requirement, Air Mobility Command is installing avionics upgrades and a global air traffic management system to its aircraft. Secondly, the global transportation network enables the United States Transportation Command to maintain a high operations tempo while reducing the personnel tempo of its expediters. This information network, established in 1998, provides universal tracking to each item, crewmember, and vehicle in the defense transportation system whether enroute or scheduled to depart. Any individual with a login-name and password can access this network through the Internet and no longer needs to contact an expediter for information.

Technological innovations have also created newer more efficient engines that can replace aging engines onboard Air Mobility Command's fleet of C-5 aircraft. To achieve this, Lockheed Martin proposed a C-5 modernization program that includes new engines and the global air traffic management system that will extend the useful life of the C-5 beyond the year 2015.[206] However, these modifications fall short of addressing some of Air Mobility Command's major issues. First, even with an upgraded C-5 fleet, Air Mobility Command faces a shortfall in the requirement for transporting outsized and oversized cargo. Secondly, even with the projected increase in the C-5's range, it would still require air refueling for overseas sorties. Thus, upgrading the C-5 fleet ignores the high personnel tempo issue.

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[204] Shalkashvili, 11.
[205] Bill Sweetman, "A Rising Imperative: More Demands for Airlift" *Jane's International Defense Review*, 2/1998, 22.

Technological innovations can also improve mobility operations by providing operational personnel with the needed technological leverage to perform the increased number of steady-state operations while reducing their personnel tempo. In achieving this goal, several aircraft manufacturers have plans to create larger and longer-range air transports and tankers because they perceive Air Mobility Command as needing that capability. For example, planners at Lockheed Martin studied 30 different aircraft designs and sifted out four basic concepts.[207] All four of Lockheed's concepts provide more efficient operating costs to include fifteen percent greater fuel economy, thirty percent improved lift-to-drag ratios, and twenty-five percent lighter airframes.[208] The largest of Lockheed's concepts estimates a 12,000 nautical mile range which would eliminate the need to air refuel an airlifter on global missions.

As noted earlier, range is important in relieving the bottlenecks imposed by a smaller enroute infrastructure. The C-17, currently employed as a strategic airlifter, has a shorter range than either the C-141 or the C-5. Thus, the C-17 is dependent on either aerial refueling or the enroute infrastructure. One congressional study identifies the C-17 as a replacement for the C-141, and another congressional study cites it as the replacement of the C-5.[209] Yet, the current acquisition program provides neither enough C-17s to replace the C-141 fleet nor enough C-17s to replace the C-5 fleet. Air Mobility Command needs a new strategic airlifter capable of transporting outsized and oversized cargo that is independent of aerial refueling and requires less support from the mobility enroute infrastructure.

If Air Mobility Command can eliminate the need to air refuel its transports on global missions, it can meet the need for tanker support to combat aircraft while reducing the tanker fleet's personnel tempo. Combat aircraft use smaller fuel tanks in order to attain greater maneuverability, but smaller tanks translate to shorter range. Air refueling is a powerful force multiplier that produces tremendous operational and tactical flexibility far and above simple range extension.[210] Another one of Lockheed's concepts, the joined-wing design, provides innovative solutions to the tanker fleet by refueling two combat aircraft at once.

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[206] Fricano, 66.
[207] David A. Fulghum, "Future Airlifters Promise Global Range," *Aviation Week & Space Technology*, 20 January 1997, 51.
[208] Bill Gregory, "Tanker-Transports Future Airlifters are Likely to be Versatile Multimission Aircraft," *Armed Forces Journal International*, December 1997, 18
[209] US Congresss, *Strategic Airlift: Improvements in C-5 Mission Capability Can Help Meet Airlift Requirements.* US Congress, *Military Airlift: Options Exist for Meeting Requirements While Acquiring Fewer C-17s.*
[210] Matthews, 29.

Both Congress and the Air Force itself have delayed desperately needed technological advances for Air Mobility Command. Congress is forcing Air Mobility Command's pursuit of technological advance to remain at a snail's pace due to the congressional agreements limiting the Department of Defense budget. However, Congress will have to provide funding to obtain new air mobility designs if the armed forces are to have the rapid global mobility capability that the national security strategy requires. Despite the requirement to improve air transport capability, the Air Force seems narrowly focused on development and procurement of the F-22 at the expense of other critically important air mobility technological requirements. The Air Force has repeatedly emphasized on the F-22 program in public and before Congress.[211] In contrast, the commander in chief of United States Transportation Command seems to go it alone, with little congressional or service support, when requesting technological advancements for Air Mobility Command.

Pursue New Air Mobility Aircraft Designs

Peacetime military innovation occurs when respected senior military officers formulate a strategy for innovation.[212] Albeit the concept of air mobility is not new, General Ronald Fogleman became an advocate in 1992 while assigned as the commander in chief of United States Transportation Command and then subsequently Air Force chief of staff. A change in the strategic security environment resulting from the collapse of the Soviet Union may have been the catalyst for his advocacy.[213] With the collapse of the Soviet Union the security environment became more uncertain because the United States is no longer in a bipolar world. Uncertainty in the security environment arose from questions about the national interests that the United States would face in a multi-polar world or in a world where the United States would face asymmetric threats from weaker enemies. The concept of rapid global mobility provides the United States with the means to project its military capabilities around the world to either punish an act of aggression, pre-empt an act of aggression, or deter an act of aggression. It is important to develop air mobility into a rapid global mobility force that has the flexibility to transition from the steady-state operations to a major theater war.

[211] Robert Wall, "Pace of F-22 Testing Puts USAF Under Fire," *Aviation Week & Space Technology*,Vol. 152, no. 13, 27 March 2000, 36.
[212] Stephen Peter Rosen, *Winning the Next War,* London: Cornell University Press, 1991, 21.
[213] *Ibid*, 251.

Now is the time to pursue innovations in air transport design, rather than waiting for a major theater war. Once built and employed during peacetime, analysis on the new designs can accrue and errors can be recognized and corrected before their use in war.[214] This environment encompasses a vast array of potential crisis spots on the globe, which requires a greater reliance on rapid global mobility, whose reduced force structure and worldwide infrastructure currently limits our capabilities.

According to Stephen Rosen, The United States can best face the issues associated with choosing new technologies by managing uncertainty.[215] Looking through this lens, air mobility becomes a priority for force structure modernization because, if the proper configurations of equipment cannot arrive in theater when required, the United State's ability to intervene in a crisis greatly diminishes. The United States needs to emphasize mobility forces now because the most opportune time for technological advancements occurs during peacetime.[216]

Update the Force Structure

The National Security Strategy defines national interests that extend beyond the United States borders and, in doing so, it establishes a requirement for military intervention to secure those interests. In citing the requirement for intervention, the secretary of defense, through the Quadrennial Defense Review, identifies several different types of interventions that the United States must prepare for. This policy of intervention, which the United States has employed numerous times since the end of the Cold War, affects several force structure issues to include an increased operations tempo and an increased personnel tempo. In addition, the concept of rapid global mobility has become the means to achieve effective military intervention and, as such, has become the backbone of both military and peacetime operations. The resulting increase in the need for air mobility operations has occurred alongside the decline of both the air mobility force structure and the worldwide air mobility infrastructure. In order to meet the challenges created in the new strategic environment, Air Mobility Command must continue its pursuit of technological innovations to include new aircraft designs. New airlift designs should include intercontinental range without aerial refueling, and new tanker designs should provide for greater cargo capacity combined with greater offload capability. Air Mobility Command can modernize

[214] *Ibid*, 182.
[215] *Ibid*, 251.

most of its aging fleet of aircraft in order to address some issues. However, only a fleet of larger and longer-range air transports will reduce the personnel tempo while maintaining a high operations tempo. If the United States fails to meet this challenge, it limits its ability to intervene in crises and, consequently, degrades its leadership position in the world.

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[216] US Congress. *Moving US Forces: Options for Strategic Mobility*, 4.

CHAPTER 7

CONCLUSION

Obtaining additional air transport mobility--and obtaining it now-- will better assure the ability of our conventional forces to respond, with discrimination and speed, to any problem at any spot on the globe at a moments notice.

President John F. Kennedy

I began this study by examining the force structure complexities of the Air Force's largest and most diverse command, Air Mobility Command. I next examined the mobility force structure requirements and challenges in air mobility planning. Force Structure developed from the two major-theater wars model established by the MRS BURU, where rapid mobility conducted by mobility air forces would reduce the risk to friendly forces.

An analysis of combatant planning and mobility planning reveals incongruities involved with developing a TPFDD. Air mobility planning succumbs to consensus planning, where compromises can take priority over expediency. The planning process assumes air and sea superiority to protect both air and sea lines of communication. The MRS BURU analyzed four scenarios to identify the challenges with prepositioning, sealift, and airlift. An examination of the two major-theater wars model identified the reasons for designing the current forces structure for Air Mobility Command.

The second section of this study analyzed current force structure capabilities. An examination of current force structure included an analysis of the different airframes' capabilities and limitations, which identified exactly where the airlift shortfall occurs. A corollary examination of the en route force structure further revealed additional shortfalls in throughput. The study consequently revealed that the current force structure is unable to meet the demands imposed by a two major-theater wars model. An examination of the tanker fleet revealed a third shortfall in the air mobility system. The proposed upgrades to these areas will take 20 years to complete, but do not address the need for more airframes.

The final section of this study examined the growing number of steady-state operations that mobility air forces have been conducting throughout the 1990s and will continue to conduct in during this century. In addition, these steady-state operations occur at the last minute, which circumvents the TPFDD planning process. The force structure requirements that stem from the growing number of contingency operations require a flexible and rapid global mobility system that only Air Mobility Command can provide. Mobility air forces work to support steady-state operations. Contingency operations require GRL units comprised of ad hoc personnel who deploy away from their permanent duties, thus leaving a shortfall in their organization. Furthermore, a number of contingencies overlap at any given time. It becomes clear that Transportation Command requires a force structure comprised of airlifters able to perform numerous missions and personnel to work the expeditionary en route infrastructure of the GRL concept.

Air Mobility Shortfall:Two Major-Theater Wars

This study sought an answer to the question: Can Air Mobility Command's force structure, based on the possibility of fighting two major theater wars, satisfy those requirements and the requirements for steady-state operations? What this study found was that the current force structure can neither meet the requirements imposed by the MRS BURU for two major-theater wars, nor meet the requirement for steady-state operations. Air Mobility Command is finding it difficult to prepare for two major theater wars while maintaining the increased number of steady-state operations that are both diverse in their objectives and their transportation requirements. Yet, the need for air mobility is increasing due to several factors, such as overseas basing reductions and the decreasing number of military airlifters in service. These dynamic influences create a tremendous challenge for the force structure of Air Mobility Command.

Air Mobility Command's current force structure creates a type of identity crisis which results in funding problems as well as other challenges associated with a constrained force structure. This study tried to bring into focus the inadequacy of the current force structure of Air Mobility Command. A compromise force structure, such as one that may occur, due in part to the C-17 acquisition program, is likely to reduce Air Mobility Command capabilities. The currently proposed fleet of C-17s will face insurmountable challenges in attempting to satisfy the requirements of today's steady-state operations. Furthermore, the cost of a compromise will occur in the form of higher risks to military forces and United States interests abroad.

Continued US Intervention

Air Mobility is a form of airpower that should be exploited to its fullest because of the positive political gains from non-combat operations, deterrence, and combat when necessary. However, steady-state operations in support of the National Security Strategy have created an unprecedented use of Air Mobility Command forces and resources that are currently targeted for wartime use.

The US is likely to continue a policy of intervention. The concept of rapid global mobility has become the means to achieve military intervention and, as such, has become the backbone of both military and peacetime operations. The force structure of Air Mobility Command is straining to execute these steady-state operations. Further growth in these operations is beyond the capability of Air Mobility Command's current force structure.

This policy effects the force structure of Air Mobility Command in many ways.

The resultant increased operations tempo and personnel tempo occurred alongside the declination of Air Mobility Command's force structure. If Air Mobility Command is to achieve the objectives of the national security strategy, it must continue its pursuit of technological innovations to include new aircraft designs. Air Mobility Command can modernize most of its aging fleet of aircraft in order to address some issues, but only more airframes with a healthy crew ratio can maintain the high ops tempo required by the national security strategy. Air Mobility Command, as with any organization, must have a force structure to maintains its operations or reduce its operations. Air Mobility Command is already looking to ways to reduce the demands on its system.[217]

Price of Reduced US Intervention

If Air Mobility Command reduces its operations, the United States will pay a price. If the United States is unable to achieve the objectives of its national security strategy, then it will degrade its international leadership position. It is important to continue conducting US interventions to achieve the national security objectives. Rapid global mobility is the concept

[217] The newest request for research, proposed by US Transportation Command, is to find ways to reduce the demands on the air mobility system. Information obtained by Email that was sent from the Air Mobility Command Chair at Air University, Colonel John Brower, to all Air University Students in January 2000.

that makes these operations a success. Air Mobility Command, as the lead component for rapid global mobility, requires a force structure capable of conducting these operations.

Recommendations

This study examined the force structure of Air Mobility Command and identified several challenges for Air Mobility Command if it is to achieve the objectives set forth in the National Security Strategy. The current force structure falls short of the targeted strategic environment that it sought to fulfill. In addition, the current force structure is incongruent with the vast diversity of requirements in today's strategic environment, which range from coercive military operations to humanitarian relief operations. The following five recommendations aim to outline how Air Mobility Command's force structure can be redirected to more effectively perform its missions to achieve the objectives of the National Security Strategy and to operate in the strategic environment.

Force Structure Based on Steady-State Operations

Most importantly, the Air Force should investigate the need to build a force structure for Air Mobility Command based on the current steady-state operations. Since the Gulf War, steady-state operations have employed mobility air forces in numerous different operations that require flexibility (see appendixes A through E).[218] Consequently, Air Mobility Command should determine how it employed mobility air forces engaged in steady-state operations. Perhaps the next MRS BURU, scheduled for completion in 2005, should examine the million-ton-miles per day for each operation that Air Mobility Command executed during the 1990s, of which there were scores. In constructing a force structured based on steady-state operations, several subsequent recommendations follow.

Employ Commercial Carriers

The first tenet of airlift policy is that the core of national airlift capability is the commercial air-carrier.[219] Continued reliance on the commercial air-carrier industry to supplement Air Mobility Command by transporting passengers and bulk cargo helps alleviate the

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[218] See the annexes of this study for a list of operations the Air Mobility Command has performed during the 1990s.
[219] Lt Col Robert C. Owen, "The Airlift System: A Primer," *Air Power Journal*, Vol. 9, no. 3 (Fall 1995): 1-12, 6.

expense of mobility air operations. In addition to using their own aircraft, commercial air carriers use civilian infrastructures worldwide to transport passengers and cargo. Military airlift requirements, in both aircraft and enroute infrastructure, exceed the capability that the Department of Defense can afford to buy. Air Mobility Command can operate a smaller than required enroute infrastructure because its reliance on the commercial sectors. Air Mobility Command already maximizes its employment of commercial air carriers. This study recommends continuing this partnership where Air Mobility Command employs commercial carriers during peacetime through contracts and uses them during wartime as the CRAF.

Longer-Range Airlifter

Air Mobility Command should increase its strategic airlift capability with a new strategic airlifter that can operate without refueling at intercontinental range and can transport both outsized and oversized cargo. The second tenet of airlift policy states: " The role of the military airlift fleet is to do what commercial transport aircraft or civilian aircrews cannot or won't do."[220] Commercial aircraft designs are inadequate for outsized and oversized cargo. Consequently, Air Mobility Command relies on its organic airlifters.

The third tenet of airlift states that Air Mobility Command should design military airlifters for their role.[221] A strategic airlifter should have an intercontinental range to alleviate both aerial refueling and enroute refueling. A reduced requirement for aerial refueling of airlifters will free up tanker assets for other missions already in demand. A reduced requirement for enroute refueling will alleviate the bottlenecks already prevalent in Air Mobility Command's enroute infrastructure. Air Mobility Command should examine these requirements as part of the program requirements for a new strategic airlifter. The C-17 falls short of these necessary requirements.

To transport required amounts of outsized and oversized cargo, Air Mobility Command must increase its organic airlift capability because commercial carriers are too small and require addition on-loading and offloading equipment to transport outsized and oversized cargo. A new strategic airlifter, if properly programmed, can achieve the requirements imposed national strategic objectives while, at the same time, operate with reduced support. Thus, Air Mobility

[220] *Ibid*, 8.
[221] *Ibid*, 9.

Command could airlift more cargo with less of its assets.

Air Mobility Command should also examine the feasibility of employing hypersonic technology because of the long timeframe involved with the acquisition of a new airlifter. As hypersonic technology advances, perhaps Air Mobility Command could employ the technology in a new strategic airlifter. A hypersonic airlifter acquisition program could offset hypersonic research. So long as a hypersonic design would employ a small enroute infrastructure and negate the need for aerial refueling, this idea conforms to this study's recommendation for a strategic airlifter.

New Tanker Force Structure

Strategic Air Command designed the current tanker force to perform its Single Integrated Operation Plan called SIOP. Today, tanker forces require greater flexibility to meet the demands of the steady-state operations that they perform daily. Of the two overarching requirements, the immediate requirement is to increase the tanker's crew ratio. As noted earlier, the tanker force has been overextended for ten years which has resulted in low crew retention. Second, Air Mobility Command needs to examine its requirement for a new tanker aircraft because the SIOP is only one of many missions that the tanker now performs. Air Mobility Command is standing up the KC-XX branch in its plans division to examine the requirements for a new tanker.[222] This branch should examine tanker usage during the past ten years to gain insight into how the tanker has become the critical asset in today's steady-state operations. The Plans division also needs to examine the unfulfilled requirements of tanker forces, that is, those requests for tanker support that were denied due to the inadequate size of the tanker fleet.

Continue Upgrade Programs

The current upgrade programs aim to bring mobility air forces "up to code." These programs enable yesterday's aircraft to conform to aviation regulations and operate in today's aviation environment. These upgrade programs address the short-term requirements of maintaining Air Mobility Command's capability to operate over in the skies of nations worldwide. In addition, these upgrades will help to lengthen the life-span on the C-5 and KC-

[222] Gen Charles T. Robertson, *Speech to the Maxwell Chapter of the Airlift/Tanker Association*, Maxwell AFB, Ala.: 2 March 2000.

135 in order to facilitate the necessary examinations of both strategic airlift and aerial refueling requirements by Air Mobility Command.

Bottom Line

The situation for air mobility has changed. Today's strategic environment differs from the one prophesized when the Cold War ended ten years ago. To achieve diverse objectives, the National Security Strategy seeks to employ mobility air forces for a range of operations and more so than in the past. In achieving these objectives, both airlifters and tankers perform a variety of missions, some of which are incongruent with past missions. Consequently, Air Mobility Command's force structure should reflect these new requirements. Finally, the Air Force should allocate resources to create a force structure for Air Mobility Command that can achieve national objectives.

Appendix A

Emergency Relief Operations

Event	Dates	Total Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel in million	Remarks	Source
Hurricane Andrew	25 Aug 28 Oct 92	724	13,500	21,500.0				AMC/HO
Byelorussian Children	31-Aug-92	70	1					AMC/HO
Typhoon Omar	1Sep 25 Sep 92	59	750	2,000.0				AMC/HO
Liberia Evacuation	12-Oct-92	1	21					AMC/HO
Armenia Flour Delivery	4 Nov 11 Nov 92	5		236.0				AMC/HO
Pakistan Flood Relief	6 Dec 20 Dec 92	6		415.0			Outsized cargo	AMC/HO
Bosnian War Victims	3-Feb-93	1	8					AMC/HO
UN Support in Cambodia	17May 29 May 93	24	254	326.0	11	0.14		AMC/HO
UN Protection In Macedonia	5 Jul 12 Jul 93	20	334	850.0				AMC/HO
Midwest Flood	11 Jul 1 Aug 93	20	141	797.0			Used ANG & AFRES	AMC/HO
Nepal Flood	11 Aug 15 Aug 93	3						AMC/HO
Support UN in Somalia	25 Aug 27 Aug 93	5	400					AMC/HO
	26 Aug 19 Dec 93	8		147.0				AMC/HO
	1994	6		191.9				AMC/HO
Indian Earthquake	4-Oct-93	2						AMC/HO
Marine support in Somalia	5 Oct 13 Oct 93	56	1,300	3,000.0	169	13.4	Outsized cargo	AMC/HO
Naepal supportin Somalia	24 Oct 30 Oct 93	5	350	250.0				AMC/HO

Event	Dates	Total Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel in million	Remarks	Source
Los Angeles Earthquake	17 Jan 25 Jan 94	10	10	170.0			Outsized cargo	AMC/HO
Somalia Redeploy	25-Mar-94	1						AMC/HO
Rwanda Evacuation	10 Apr 14 Apr 94	2	342					AMC/HO
Belgian support to Rwanda	10 Apr 14 Apr 94	12					Outsized cargo	AMC/HO
Tanzania support	11 May 17 May 94	13		239.0				AMC/HO
Uganda support	22 Jun 30 Jun 94	72	TALCE	150.0			Outsized cargo *est. tons & sorties	AMC/HO
MRI system to Ukraine	26-Jun-94	1		34.3				AMC/HO
Hurricane John evacuation	14 Aug 25 Aug 94	9	1,107				3 commercial	AMC/HO
Vladivostok Flood	30-Oct-94	1		20.0				AMC/HO
Nepal support to Haiti	3 Feb 10 Feb 95	8	410					AMC/HO
Mongolia support	1991 11 Apr 95	12		300.0			*estimate 25 tons average	AMC/HO
OK Fed building bombing	19 Apr 4 May 95	25	1,359	3,864.0			Outsized cargo	AMC/HO
Ziare medical support	11-May-95	1		1.0			ongoing effort	AMC/HO
Hump Anniversary	23 May 30 May 95	2			2			AMC/HO
Haitian police support	8-Jun-95	3	350				First of 5200 police	AMC/HO
NASA support	7-Jul-95	1	3					AMC/HO
Croatia support	13-Aug-95	1		75.0				AMC/HO
Tadzhikistan support	17-Aug-95	1		38.0			Contracted DC-8	AMC/HO

Event	Dates	Total Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel in million	Remarks	Source
Rwanda support	6-Sep-95	1		168			Contracted 747 *42 pallets x 2 ton ea.	AMC/HO
Croatia support	6-Sep-95	1		36.0			Contracted DC-8 *18 pallet x 2 ton ea.	AMC/HO
Kurdish support	7-Sep-95	2					2 Generators outsize cargo	AMC/HO
Hurricane Marilyn	16 Sep 10 Oct 95	212	2,348	3,617.0				AMC/HO
Vietnam medical support	3-Oct-95	1		28.0				AMC/HO
Mine Field Markers	2-Feb-96	3		40.0	6			AMC/HO
Isreal support	5-Mar-96	1		1.4	1	0.09	explosive-detection	AMC/HO
retrieve remains Loas	27-Mar-96	1					remains from Loas 25 yr ago.	AMC/HO
Retrieve remains of SecCom	6-Apr	1					12 bodies total	AMC/HO
Uphold Democracy redeploy	17-Apr-96	1	84				Commercial carrier	AMC/HO
Kobar Towers retreive remains	27-Jun-96	1					19 bodies	AMC/HO
AEF III	30-Jun-96				4		Augment Southern Watch	AMC/HO
Mongolia support	2-Aug-96	1		24.0			2 stow away fatalities	AMC/HO
Burundi support	4-Sep-96	1	30	1.0				AMC/HO
Northern Watch support	11-Sep-96	2					Outsized cargo	AMC/HO
Pacific Haven	17 Sep 18 Sep 96	2	44					AMC/HO

Event	Dates	Total Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel in million	Remarks	Source
Guardian Assistance	14-Nov-96	5					Deployed standby for relief operations	AMC/HO
Christmas airdrop	16 Dec 21 Dec 96							AMC/HO
Retreive remains WW II	16-Jan-97	1					5 aircrew from B-24 liberator	AMC/HO
Sioux relief	19-Jan-97	1		20.0			AFRES crew	AMC/HO
Last Deep Freeze sortie	2-Mar-97						Supplying Antartica for 40 years	AMC/HO
Boliva support	2-Apr-97	1					Diocese of Joliet medical supplies	AMC/HO
Grand Forks Flood	18 Apr 8 Aug 97	13	143	146				AMC/HO
Korean Crash support	5 Aug 9 Aug 97	5	31				NTSB, +FBI, +FAA, +medical personnel	AMC/HO
NASA support	22-Aug-97	1			2		satellite	AMC/HO
Bulgaria support	3-Oct-97	1		175				AMC/HO
Typhoon Paka	18 Dec 97 4 Jan 98						Some commercial	AMC/HO
New Mexico blizzard relief	30 Dec 97 4 Jan 98	5		25.0				AMC/HO
Operation Recuperation	10 Jan 14 Jan 98	4		181.0			Quebec winter storm	AMC/HO
NE winter storm	15 Jan 18 Jan 98	18						AMC/HO
China earthquake	16-Jan-98	1		40.0			40 tons on 18 pallets	AMC/HO
Ecudor support	2-Mar-98	1	6					AMC/HO
Presidential support	9 Mar 9 Apr 98	104			100		trip to Africa	AMC/HO

Event	Dates	Total Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel in million	Remarks	Source
Op Homecoming silver annivesary	12-Mar	1	50					AMC/HO
Presidential support	10 Jun 8 Jul 98	35			7		Trip to China	AMC/HO
Search & Rescue support	19-Jun-98	2			1		AFRES crews	AMC/HO
Operation Phoenix Flame	2-7 Jul 98	12	300	740.0			Everglades fires	AMC/HO
Transport remains of unknown soldier	10-Jul-98	1						AMC/HO
Kenya Embassy bombing support	7-9 Aug 98	2	15				15 patients--1 sortie 10 remains--1 sortie	AMC/HO
Hurrican Georges	21 Sep 12 Oct 98	190	450	8,500.0				AMC/HO
Hurricane Mitch	1 Nov 98 19 Mar 99	200						AMC/HO
Christmas Island support	9-10 Jan 99	1	1					AMC/HO
Presidential support	22-Jun-99	1	3					AMC/HO
Antartica support	11-Jul-99	1		12.0	1		*6 pallets airdrop estimate 12 tons	AMC/HO
Turkish earthquake	18 Aug 10 Sep 99	20	70		2		First sortie refueled	AMC/HO
KC-97 transport	14-Oct-99	1					from Beale to Scott	AMC/HO
Antartica support	16-Oct-99	1					Chemo-tharapy drugs	AMC/HO
Totals		468	889	9,252	11	0		

Appendix B

Humanitarian Operations

Operation	Dates		Total Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel Transfer	Remarks	Sources
Nuclear Forces Initiative	Sep 91	Jun 92							AMC/HO
Provide Hope	Jun 92 May 93		109		2,438			25 commercial sorties	AMC/HO
	thru Apr 95	7	300						AMC/HO
	thru Jun 97	17	500						AMC/HO
Provide Promise	3 Jul 93	Sep	1694	35,035	6,515			Used ANG & AFRES	AMC/HO
Provide Transition	Aug 92 Oct 93		326	8,805	265				AMC/HO
Provide Relief	Aug 92 Feb 93		3100	0	34,400				AMC/HO
NATO Ministers Agreemant	to	25 Sep 92							AMC/HO
Impressive Lift	13 Sep Sep 92	29	94	974	1,168				AMC/HO
Provide Refuge	13 Feb Mar 93	9	4	812	149			3 commercial sorties	AMC/HO
Provide Promise 94	8 May Jul 94	26	382		7,000				AMC/HO
Support Hope	22 Jul Sep 94	11	700	11,000	23,000	448		President--Immediate massive increase	AMC/HO
Deny Flight	23 Aug 94 -								AMC/HO
Project Sapphire	21Nov Nov 94	23	2		1	4		Enriched uranium	AMC/HO
Safe Passage	1 Feb 95 31 Jan 96		161	27,000				Contract - Miami Air	AMC/HO
Quick Lift	30 Jun Aug 95	10	27	4,742	1,504				AMC/HO
Joint Endeavor	4 Dec 95 16 Sep 97		8000						AMC/HO

Operation	Dates	Total Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel Transfer	Remarks	Sources
Provide Promise (update)	3 Jul 93 9 Jan 96	13,000		160,000				AMC/HO
Assured Response	7 Apr 6 May 96	103	2,153	2,148				AMC/HO
Desert Focus	18-Aug-96	1	300				Contract 747	AMC/HO
Noah's Ark	17-Aug-97	1					90 dogs & cats	AMC/HO
Guardian Retrieval	21 Mar 17 Apr 97	115	1,200	2,400				AMC/HO
Baltic Challenge 98	8 Jul 20 Jul 98	2					AFRES	AMC/HO
Kieko Lift	9 Sep 10 Sep 98	1	12		3			AMC/HO
Shinig Hope	4 Apr 8 Jul 99	124	913	5,939				AMC/HO
Provide Refuge	5-May-99		3,000				Contracted Carrier	AMC/HO
Totals		13,347	7,578	170,487	3			

Appendix C

Military Operations

Operation	Dates	Total Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel in millions	Remarks	Sources
Southern Watch	18 Aug 92 - ongoing							AMC/HO
Restore Hope	Dec 92 - May 93	1182	51,431	41,243	1170	82.4		AMC/HO
Uphold Democracy	8 Sep - 31 Dec 94	1528	15,000		92			AMC/HO
Vigilant Warrior	10 - 13 Oct 94		400					AMC/HO
Somalia II	7 Jan 24 Mar 95	59	1,400	1,400			Used commercial carriers	AMC/HO
Desert Strike	2 Sep 3 Sep 96	1	75					AMC/HO
Phoenix Scorpion I	19 Nov 25 Nov 97	51		3,000	208	7.4	Airbridge to augment Southern Watch	AMC/HO
Phoenix Scorpion II	8 Feb 3 Mar 98	300	10,000	11,000	200	4.7	Deployment phase	AMC/HO
Phoenix Duke I	11 Oct Nov 98						never used deployed assets	AMC/HO
Phoenix Duke II	18 Feb 24 Mar 99						Allied Force build up with 150 tankers	AMC/HO
Totals		3,121	78,306	56,643	1,670	95		

Appendix D

Exercises

Exercise	Dates	Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel in millions	Remarks	Sources
Intrinstic Action	2 - 20 Aug 92	53	1,000	3,767				AMC/HO
Ocean Venture	Apr - May 93	493	16,000	6,700	137	4.3	Some commercial	AMC/HO
Peacekeeper 94	30 Aug - 12 Sep 94	52	320	610				AMC/HO
Peacekeeper 95	19 May - 1 Jun 95	50	300	430				AMC/HO
Coronet bat	2 - 3 Jun 95				6			AMC/HO
Paratrooop Drop	27-Jun-95	6	204	55.0				AMC/HO
Cooperative Nugget	5 -29 Aug	14						AMC/HO
Intrinsic Action	17-Aug-95	100	2,200	1,300			Some commercial	AMC/HO
Big Drop III	15-May-96	136	3,700					AMC/HO
Cornerstone 96	28-May-96	1		16			Romania --4 pallets 4 trucks-est. tons	AMC/HO
Centrazbat 97	14-Sep-97	8	500		24		Paratroopers to Kazakhstan	AMC/HO
Purple Dragon	28 -29 Jan 98	60						AMC/HO
Totals		913	24,224	12,878	167	4.3		Totals

Appendix E

Totals

Exercise	Dates	Airlift Sorties	Passengers	Tons of Cargo	Refuel Sorties	Fuel Transfer	Remarks	Source
Totals	1 Jun 92 29 Oct 99	34,830	222,691	364,806	2,598	112		

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